Objectives: To measure girls’ and boys’ exposure to alcohol advertising in magazines and to compare this exposure with that of legal-age persons.

Design, Setting, and Subjects: Alcohol advertisements (N=6239) in 103 national magazines for which placement, audience, and cost data for 2001 and 2002 were available, categorized by year, beverage type, and brand. Placement and readership (age and sex) data generated estimates of media exposure for the age groups 12 to 20, 21 to 34, and 21 years and older.

Main Outcome Measures: Gross rating points, an advertising industry standard measure of the level of media exposure of a given population, and gross rating point ratios comparing exposure of different demographic groups.

Results: Alcohol companies spent $590.4 million to place 471 beer and ale advertisements (8%), 4748 distilled spirits advertisements (76%), 116 low-alcohol refresher advertisements (2%), and 904 advertisements for wine (14%) in magazines in 2001 and 2002. In 2002, underage youth saw 45% more beer and ale advertising, 12% more distilled spirits advertising, 65% more low-alcohol refresher advertising, and 69% less advertising for wine than persons 21 years and older. Girls aged 12 to 20 years were more likely to be exposed to beer, ale, and low-alcohol refresher advertising than women in the group aged 21 to 34 or women in the group aged 21 years and older. Girls’ exposure to low-alcohol refresher advertising increased by 216% from 2001 to 2002, while boys’ exposure increased 46%.

Conclusion: Exposure of underage girls to alcohol advertising is substantial and increasing, pointing to the failure of industry self-regulation and the need for further action.


Underage drinking is a serious public health problem in the United States, associated with lower educational attainment, greater likelihood of attempting suicide, or of engaging in risky sexual behavior, and increased risk of drinking-driving mortality compared with the population 21 years and older. Approximately 10.7 million 12- to 20-year-olds reported having had a drink in the past month in 2002, and 7.2 million of these had 5 or more drinks on the same occasion. Early initiation of alcohol use puts young people at higher risk for alcohol dependence and alcohol-related injury, while heavy exposure of the adolescent brain to alcohol may cause loss of memory and other skills. Imaging research has found greater activity in areas of the brain previously linked to reward, desire, positive affect, and episodic recall when teens with alcohol use disorders were shown alcoholic beverage advertisements, with brain response highest in the heaviest consuming youths. Youth exposure to alcohol marketing predicts awareness of alcohol advertising, which in turn affects youths’ intentions to drink and drinking behavior. National survey data indicate that in 2002 8th- and 10th-grade girls surpassed boys for the first time in 30-day prevalence of alcohol use. To our knowledge, there are no US data available to ascertain whether differences in the type of beverage consumed may be responsible for this increase. However, studies in Wales and Sweden have found that the introduction of “alcopops” (alcoholic lemonades, iced teas, and other fruity and sweet-flavored alcoholic beverages, also known as low-alcohol refreshers [LARs], although they contain more
alcohol than many beers) accounted for much of the recorded increases in alcohol consumption, particularly among younger teenagers.

Alcoholic beverage companies spent $1.9 billion on advertising in magazines and newspapers, on television and radio, and outdoors in the United States in 2003. Magazine advertising accounted for 21.1% of this spending. Beer and distilled spirits companies spent the most in the measured media of broadcast, outdoor, and print. Because distilled spirits producers cannot advertise on national broadcast networks owing to a voluntary ban by those networks, they rely more heavily on magazine advertising. In the magazines analyzed for this study, distilled spirits advertisers accounted for 76% of the expenditures for alcohol product advertising in 2002.

Garfield et al examined alcohol advertising in 35 major US magazines between 1997 and 2001 and found 60% greater advertising for beer and for distilled spirits for every million adolescents in a magazine’s readership. The Center on Alcohol Marketing and Youth found that, per capita in national magazines in 2001, youth aged 12 to 20 years were exposed to 45% more beer and ale advertising, 27% more distilled spirits advertising, 60% more advertising for LARs, and 58% less advertising for wine than readers 21 years and older. However, neither study explored sex differences, and Garfield et al did not differentiate between advertisement type (size, color, etc), because it is not practical to assign a national audience estimate to advertisements appearing in a portion of a magazine’s circulation. Our study population thus comprised 6239 advertisement occurrences, which accounted for 71% of spending on alcohol advertising in magazines in 2001 and 75% of such expenditures in 2002.

### Magazine Advertising Exposure

In selecting advertising occurrences to analyze, we began by identifying all alcohol brand advertising by publication and date, using data from TNS Media Intelligence/CMR, an advertising industry standard reference for advertising occurrences and expenditures that monitors more than 300 periodicals. From these 10622 occurrences, we selected only those that appeared in national or full editions of publications whose audiences were measured by MRI in 2001 and 2002. Nonproduct advertising (eg, corporate advertising, public service advertising, etc) was omitted, as was advertising in regional editions of magazines, because it is not practical to assign a national audience estimate to advertisements appearing in a portion of a magazine’s circulation. Our study population thus comprised 6239 advertisement occurrences, which accounted for 71% of spending on alcohol advertising in magazines in 2001 and 75% of such expenditures in 2002.

### Statistical Analysis

In accord with the classification of Impact Databank, a market research publication and database serving the alcoholic beverage industry, the 255 brands of alcohol advertised in magazines examined for this study were collapsed into 4 categories: beer and ale, distilled spirits, LARs, and wine. Only magazines with alcohol product advertising in 2001 or 2002 were included in the analysis, because the purpose of this study was to measure youth exposure to alcoholic beverage advertising in magazines. The selection criteria yielded 103 magazines.
The statistical analysis for this study relied on gross rating points (GRPs), an advertising industry standard measure of audience exposure. Gross rating points are the product of reach \( \times \) frequency. Reach describes the percentage of a given demographic group that has the opportunity to see a given advertisement or campaign through exposure to specific media. Frequency indicates the number of times individuals have an opportunity to see a given advertisement or campaign through exposure to specific media and is most often expressed as a mean number of exposures. Media planners use GRPs to describe the amount of advertising exposure delivered in a given period to an audience.\(^2\) Gross rating points are central to media planning because they provide a basis for determining the relative value of the investment being made in a given advertising schedule, an important criterion (along with actual expenditures) in determining the cost-effectiveness of a campaign.\(^2\) Because they provide population-weighted estimates of exposure to advertising, GRPs provide a comparable measure of the total gross delivery of an audience segment to an advertiser.\(^2\)

Dollars and advertisements were counted by alcohol brand and by magazine. Gross rating points were calculated by alcoholic beverage category, brand, sex, magazine, and age group (12-20, 21-34, and \( \geq \)21 years). From a public policy perspective, comparison of the underage and legal-age (ie, 12-20 and \( \geq \)21 years, respectively) audiences for alcohol advertising is relevant and important. However, although the legal purchase age for alcohol is 21 in all 50 states, alcohol industry sources often state that their actual target market is not persons 21 years and older, but considerably narrower, eg, 21 to 34.\(^7\)\(^-\)\(^9\) Therefore, we also compared exposure of underage readers with that of persons between the ages of 21 and 34. Gross rating point ratios were calculated to facilitate comparison of the exposure of underage and legal-age readers, and of readers aged 12 to 20 and 21 to 34 years. Gross rating point ratios greater than 1 indicate that the probability of seeing the advertising on a per capita basis was higher, and thus the likelihood or effectiveness of exposure greater, for the younger age group than for the older one.

**RESULTS**

**OVERVIEW**

In 2001 and 2002, alcohol companies spent $590.4 million to place 471 beer and ale advertisements (8%), 47,484 distilled spirits advertisements (76%), 116 LAR advertisements (2%), and 904 advertisements for wine (14%) in magazines. Between 2001 and 2002, magazine advertising spending increased by 5%, while the number of advertising placements declined by 4%, as did overall audience reach and frequency, suggesting that advertising placements became more expensive. The greatest increases in expenditures came from wine advertisers, whose spending grew by 30% and advertising placements by 20%, and LAR advertisers, whose spending rose by 80%, resulting in a 58% increase in advertising placements.

Table 1 shows overall levels of exposure to alcohol advertising in magazines, measured in GRPs, for males, females, and the total population for the 3 age groups (12-20, 21-34, and \( \geq \)21 years). As Table 2 demonstrates, exposure of underage youth declined between 2001 and 2002 in every category except LARs, for which exposure of boys increased by 46%, while girls’ exposure grew by 216%.

Table 3 presents ratios of exposure for the different age and sex groups, using GRPs as the means of comparison. In 2002, on a per capita basis, underage youth saw 45% more beer and ale advertising, 12% more distilled spirits advertising, 65% more LAR advertising, and 69% less advertising for wine than persons at or older than the legal alcohol purchase age of 21. Tables 1 and 3 show that much of the time 21- to 34-year-olds were the primary audience for beer and ale, distilled spirits, and LAR advertising. Underage readers had the lowest exposure to wine advertising compared with the other age groups.

**SEX, BRAND, AND VEHICLE**

Demonstrating exposure by sex, Table 3 shows that girls aged 12 to 20 had almost the same exposure to beer and ale and LAR advertising as women aged 21 to 34, and they were substantially more likely to be exposed to beer and ale, LAR, and distilled spirits advertisements than women 21 years and older. In fact, girls had 95% more exposure to LAR advertising than women 21 years and older in 2002. In contrast, although boys aged 12 to 20 were more likely to be exposed to beer and ale and LAR advertising than men 21 years and older, they were substantially less likely to be exposed to any of this advertising than men aged 21 to 34.

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**Table 1. Exposure to Alcohol Advertising in National Magazines, 2002**

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beer and ale</td>
<td>1451</td>
<td>1659</td>
<td>999</td>
</tr>
<tr>
<td>Distilled spirits</td>
<td>9162</td>
<td>12544</td>
<td>8209</td>
</tr>
<tr>
<td>Low-alcohol refreshers</td>
<td>555</td>
<td>663</td>
<td>334</td>
</tr>
<tr>
<td>Wine</td>
<td>489</td>
<td>1908</td>
<td>1549</td>
</tr>
</tbody>
</table>

*Data are given as gross rating points for age groups (in years). Data are from TNS Media Intelligence/CMR 2002, Mediamark Research Inc (MRI) Adult Study Spring 2003, and MRI Teenmark 2002.

---

**Table 2. Change in Youth (Ages 12-20 Years) Exposure to Alcohol Advertising in National Magazines, 2001-2002**

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beer and ale</td>
<td>−8</td>
<td>−13</td>
<td>−2</td>
</tr>
<tr>
<td>Distilled spirits</td>
<td>−19</td>
<td>−22</td>
<td>−16</td>
</tr>
<tr>
<td>Low-alcohol refreshers</td>
<td>109</td>
<td>46</td>
<td>216</td>
</tr>
<tr>
<td>Wine</td>
<td>−14</td>
<td>−13</td>
<td>−13</td>
</tr>
</tbody>
</table>

*Data are given as percentages. Data are from TNS Media Intelligence/CMR 2001 and 2002, Mediamark Research Inc (MRI) Adult Study Spring 2002 and 2003, and MRI Teenmark 2001 and 2002.*
Because media plans and the advertising placements that flow from them are created by brand, it is useful to examine the brands responsible for the greatest exposure of young people to alcohol advertising in magazines. For girls, 16 brands (14 distilled spirits brands, 1 beer, and 1 LAR) accounted for 50% of exposure to alcohol advertising. Five of these brands had greater exposure in the group aged 12 to 20 than in the group aged 21 to 34; these 5 and an additional 10 brands had greater exposure in the underage audience than in the legal-age audience. For boys, 13 brands (11 distilled spirits products and 2 beers) led to 50% of exposure to alcohol advertising. Although 11 of the 13 leading brands exposed boys more effectively than adults 21 years and older, only 1 of these 11 (Heineken beer) exposed boys more effectively than men aged 21 to 34.

Examination of the magazines delivering three quarters of the exposure to alcohol advertising received by girls and by boys shows that most of the exposure for both sexes came from a few magazines with high youth audience compositions. Table 4 and Table 5 show that 5 of the 6 magazines delivering most of the alcohol advertising exposure to underage boys exposed boys more effectively than men 21 years and older to the alcohol advertisements, and 2 of these 6 exposed 12- to 20-year-old boys more effectively than men aged 21 to 34. All 8 magazines delivering the bulk of alcohol advertising exposure to underage girls more effectively exposed girls than legal-age women, while 5 of

<table>
<thead>
<tr>
<th>Table 3. Relative Exposure to Alcohol Advertising in Magazines, 2002a</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category</strong></td>
</tr>
<tr>
<td><strong>Beer and ale</strong></td>
</tr>
<tr>
<td><strong>Distilled spirits</strong></td>
</tr>
<tr>
<td><strong>Low-alcohol refreshers</strong></td>
</tr>
<tr>
<td><strong>Wine</strong></td>
</tr>
</tbody>
</table>

*Data are given as gross rating point ratios for age groups (in years). Data are from TNS Media Intelligence/CMR 2001 and 2002, Mediamark Research Inc (MRI) Adult Study Spring 2002 and 2003, and MRI Teenmark 2001 and 2002.

<table>
<thead>
<tr>
<th>Table 4. Magazines With Greatest Exposure of Girls to Alcohol Advertising, 2002a</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Publication</strong></td>
</tr>
<tr>
<td><strong>Cosmopolitan</strong></td>
</tr>
<tr>
<td><strong>Rolling Stone</strong></td>
</tr>
<tr>
<td><strong>Sports Illustrated</strong></td>
</tr>
<tr>
<td><strong>In Style</strong></td>
</tr>
<tr>
<td><strong>Vibe</strong></td>
</tr>
<tr>
<td><strong>Entertainment Weekly</strong></td>
</tr>
<tr>
<td><strong>Vogue</strong></td>
</tr>
<tr>
<td><strong>Maxim</strong></td>
</tr>
</tbody>
</table>

*Data are from TNS Media Intelligence/CMR 2002, Mediamark Research Inc (MRI) Adult Study Spring 2003, and MRI Teenmark 2002.

<table>
<thead>
<tr>
<th>Table 5. Magazines With Greatest Exposure of Boys to Alcohol Advertising, 2002a</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Publication</strong></td>
</tr>
<tr>
<td><strong>Sports Illustrated</strong></td>
</tr>
<tr>
<td><strong>Maxim</strong></td>
</tr>
<tr>
<td><strong>Rolling Stone</strong></td>
</tr>
<tr>
<td><strong>Playboy</strong></td>
</tr>
<tr>
<td><strong>Entertainment Weekly</strong></td>
</tr>
<tr>
<td><strong>Vibe</strong></td>
</tr>
</tbody>
</table>

*Data are from TNS Media Intelligence/CMR 2002, Mediamark Research Inc (MRI) Adult Study Spring 2003, and MRI Teenmark 2002.
Although research has established exposure to alcohol advertising as a risk factor in youthful drinking, no studies of advertising exposure have examined the differential exposure of boys and girls to alcohol advertising in general or for different types of alcohol, to our knowledge. Federal surveys show that the prevalence of drinking among girls has surpassed that of boys. This study found girls more overexposed to alcohol advertising than boys, compared with young adults and adults of their sex. Advertising for LARs increased dramatically from 2001 to 2002, and girls' exposure to this advertising grew much faster than boys'. The study underscores the need for stricter standards for the placement of alcohol advertising.

These findings underscore the importance of the Institute of Medicine's recent recommendation that alcohol companies limit their advertising to vehicles for which youth are less than 25% of the total audience 12 years and older and move toward a 15% threshold31 (youth aged 12-20 are 15.6% of the general US population32). Such a standard would bar alcohol advertising in all but 1 of the magazines delivering the greatest exposure of alcohol advertising to underage youth and would be more protective than the current voluntary industry standard of 30% maximum youth audience for alcohol advertising.

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Correction

Error in Text. In the article by Jernigan et al titled “Sex Differences in
Adolescent Exposure to Alcohol Advertising in Magazines,” published in the
July issue of the ARCHIVES (2004;158:629-634), an error occurred in the text.
On page 633, in the “Comment” section, third paragraph, the last sentence should
have read as follows: “Of the 13 brands that gave underage boys the most ex-
posure, 5 exposed 18- to 20-year-olds more effectively than 21- to 24-year-
olds, while all 16 of the brands delivering the greatest exposure of underage
girls more effectively exposed 18- to 20-year-olds to their advertising than 21- to
24-year-olds.”