

August 26, 2014

Client-Matter: 26881-050

**VIA E-MAIL AND HAND DELIVERY**

Planning and Land Use Management Committee  
City of Los Angeles City Council  
200 North Spring Street, Room 360  
Los Angeles, CA 90012

Re: Los Angeles International Airport Signage Supplemental Use District

Dear Honorable Members of the Planning and Land Use Management Committee:

This firm represents Regency Outdoor Advertising, Inc. ("Regency"). We are writing to inform you that our client has significant concerns about the proposed Los Angeles International Airport Signage Supplemental Use District (the "SUD"). As the owner of several billboard structures on the Park One parking lot site, which is at the entrance to Los Angeles International Airport ("LAX") and is included within the boundaries of the proposed SUD, we are surprised that Regency was never consulted about the proposed SUD. Our client is the only billboard company that has signs within the SUD area, and thus its interests in the SUD are significant. The purpose of this letter is to request that the SUD be put on hold until: (1) the proposed Citywide sign ordinance is first passed, as is legally required prior to any City approval of the SUD; and (2) Los Angeles World Airports ("LAWA") engages with Regency regarding the proposed SUD. Set forth below are some preliminary objections setting forth why the SUD should be put on hold pending discussions with Regency.

**A. The Los Angeles Municipal Code Does Not Presently Allow Sign Districts at LAX.**

Before the City can approve the SUD, it must first pass the pending Citywide sign ordinance, which has language in it that would allow the establishment of a sign district at LAX. This is because the Los Angeles Municipal Code ("Code" or "LAMC") only allows sign districts to include properties in the C or M Zones.<sup>1</sup> (LAMC Section 13.11) All of the property on which LAWA would like to establish a sign district is zoned "LAX" – not C or M as required.

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<sup>1</sup> Except that R5 Zone properties may be included in a "SN" Sign District provided that the R5 zoned lot is located within an area designated on an adopted community plan as a "Regional Center," "Regional Commercial," or "High Intensity Commercial," or within any redevelopment project area. (LAMC Section 13.11(B)). LAWA's property is not zoned R5 either.

LAX's zoning represents a fundamental flaw in LAWA's proposal to seek approval of the proposed SUD because its adoption is prohibited by the express language of the Code. The LAX Specific Plan (Ordinance No. 182,542, effective July 3, 2013) states that "[a]lteration, redesign or replacement of existing off-site signs, or erection, construction or installation of new off-site signs, supergraphic signs, and mural signs shall be permitted pursuant to the establishment of a sign district *as set forth in LAMC Section 13.11.*" (LAX Specific Plan Section 14.C)(emphasis added). LAMC Section 13.11, in turn, states that each "Sign District shall include *only properties in the C or M Zones . . .*" (LAMC Section 13.11 B)(emphasis added.) LAWA did not seek a zone change or amendment to the LAX Specific Plan when it filed its sign district application, and therefore, if adopted as drafted, the SUD would include properties zoned LAX, and would not include any properties zoned C or M. This violates the LAMC's clear requirements.

The LAX Specific Plan does not allow the Code to be ignored. To the contrary, it requires strict adherence in the absence of a conflict. Specifically, the LAX Specific Plan states: "The regulations of this Specific Plan are *in addition* to those set forth in the planning and zoning provisions of the Los Angeles Municipal Code . . . and *do not convey any rights not otherwise granted under the provisions and procedures contained in the LAMC . . .*" (LAX Specific Plan, Section 3.A)(emphasis added). Simply put, LAWA cannot seek a sign district under the existing Code without first obtaining an appropriate zone change. LAWA must play by the same rules that everyone else has to and the City cannot play favorites in determining who has to apply for a zone change and who does not. By processing LAWA's application for a sign district on inappropriately-zoned land (i.e., land that is subject to the "LAX" zoning designation), the City has failed to apply its zoning rules in an even-handed manner, in the process creating an impermissible exception for LAWA, which raises significant Constitutional concerns.

**B. The Proposed SUD Findings Fundamentally Misinterpret the LAX Specific Plan and the LAMC.**

As required by the Code, the proposed SUD must be found to comply with LAMC Section 13.11 before it can be approved. The Planning Department has prepared findings which acknowledge LAMC Section 13.11's restrictions on allowable zoning designations for sign districts. However, with no apparent logic, the findings attempt to explain away the SUD's violation of the Code's zoning requirements through a fundamental misreading of the statutory language. Specifically, the proposed SUD findings state:

Notwithstanding the provision in LAMC Section 13.11 B that a Sign District shall only include properties in the C or M Zones, and certain R5 zoned properties, Section 3.B of the LAX Specific Plan provides that the Specific Plan shall prevail and supersede the applicable provisions of the LAMC wherever it contains provisions

that establish regulations, including for signage, which are *different from, more restrictive or more permissive* than would be allowed under the LAMC. Furthermore, the LAX Zone permits M uses and was created to tailor those uses to the needs of a large public airport. Section 14.D [sic] of the LAX Specific Plan specifically provides for the alteration, redesign, or replacement of existing off-site signs, or erection, construction, or installation of new offsite signs, supergraphic signs, and mural signs, *pursuant to the establishment of a Sign District in accordance with LAMC Section 13.11.* (Emphasis added.)

This finding is complete sophistry. The first sentence accurately summarizes Section 3.B of the LAX Specific Plan. However, Section 3.B has no relevance here because *there is no conflict at all* between the LAX Specific Plan's regulations and the Code's regulations regarding the establishment of signage districts. The Specific Plan requires the adoption of a sign district, pursuant to LAMC Section 13.11, in order to allow off-site signage. LAMC Section 13.11, in turn, requires that properties that are to be included in a sign district be zoned C or M. In the absence of any conflict, there is nothing for the Specific Plan to supersede in the Code. The approach taken by the above finding would only apply if the Specific Plan allowed off-site signage *without* the establishment of a sign district, in which case there would, in fact, be a conflict between the Code and the Specific Plan (with the result being that the Specific Plan would prevail). Here, however, the Specific Plan explicitly *requires* that a sign district be created pursuant to Section 13.11. There is no conflict between the Specific Plan and the Code at all. Likewise, the second sentence of the finding is a non sequitur, as it is completely irrelevant that the LAX zone permits industrial uses – nowhere in the Specific Plan or the LAMC does the issue of allowable uses play a role in determining what properties may be included within a sign district. This sentence does not provide any relevant justification for why the SUD should be considered consistent with LAMC Section 13.11. If anything, it indicates how much LAWA is stretching to have the SUD passed in advance of the proposed Citywide sign ordinance.

**C. Approving the SUD Before the Citywide Sign Ordinance Is Not Only Illegal, But Is Also Fundamentally Bad Planning.**

In addition to violating the Code's requirements regarding the establishment of sign districts, proceeding with the approval of the SUD before the approval of the Citywide sign ordinance would be putting the cart before the horse. The City has been carefully crafting a Citywide sign ordinance that will clearly spell out many of the complicated issues involved with signage, particularly off-site signage. To allow the SUD to proceed ahead of the Citywide sign ordinance will create unnecessary confusion and inconsistency with the City's signage regulations once they are adopted.

For example, the current draft of the Citywide sign ordinance, as a result of extensive input received from Council offices, property owners, billboard companies, and other stakeholders, provides a detailed set of requirements for sign reduction efforts that are required in connection with the establishment of new sign districts. One such requirement is a clearly delineated process for determining ownership of sign reduction credits. The SUD contains no such process, and does not address the issue of sign reduction credit ownership at all. Instead, the SUD simply states that LAWA “shall be responsible for the removal” of over 20,000 square feet of off-site signage from the SUD’s “LAX Vicinity Sign Reduction Area,” and “may receive” the sign reduction credits resulting from these removals. (SUD Section 8.A.) The SUD’s sign reduction area includes all of the area included within five of the City’s community plan areas (LAX, Westchester – Playa Del Rey, Palms – Mar Vista – Del Rey, Venice, and West Los Angeles), which area extends far beyond the proposed SUD’s boundaries. These community plan areas will soon become subject to the Citywide sign ordinance upon its adoption, and will then be subject to two sets of rules regarding sign credit ownership – the “shadow” regulation contained in the SUD, which is largely silent on the issue of take-down credits, and the clearly outlined regulation and process contained in the Citywide sign ordinance that is designed to minimize disputes over sign credit ownership.

As another example, the Citywide sign ordinance contains detailed descriptions of various community beautification measures that may be constructed in and around new sign districts, and also requires certain findings to be made by the City Planning Commission regarding the value of the public benefit conveyed by these measures. In contrast, the SUD offers a rough list of “visual blight reduction” measures that may be implemented within the LAX and Westchester – Playa del Rey community plan areas (which again, include areas outside the geographic boundaries of the SUD). The SUD contains no criteria for determining the value of these contemplated blight reduction measures, nor are any findings required in connection with their approval. Instead, the SUD requires the Board of Airport Commissioners to approve a blight reduction program sometime in the future, prior to the installation of off-site signs in the Landside Sub-Area. Once again, by adopting the SUD and allowing its blight reduction program mechanism to come into existence before the Citywide sign ordinance is adopted, there is a strong possibility of overlap and inconsistency between these two ordinances.

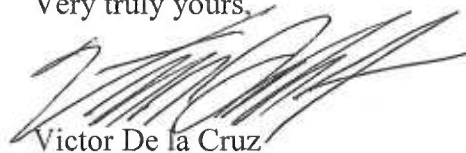
Finally, proceeding with the SUD prior to the adoption of the Citywide sign ordinance is not only illegal, and prone to creating confusion and inconsistency in the City’s signage regulations, but is also economically short-sighted and fundamentally unfair. Regency currently owns and operates several off-site billboard structures strategically located within the proposed SUD area at the primary vehicular entrance to LAX. While LAWA carved out significant opportunities for digital signage to itself, it excluded all of Regency’s signs from digital conversion without any legitimate reason (e.g., Regency’s signs are not near residences, do not create traffic hazards, etc.)

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We respectfully urge your Committee to delay approval of the SUD until LAWA engages with Regency to discuss the issues discussed above. The course currently being pursued by LAWA and the City would approve the SUD in violation of the clear language of the Code and lead to the creation of inconsistent City signage regulations.

Thank you for your time and attention to this matter. Regency reserves all rights, objections, and remedies not specifically delineated in this letter.

Very truly yours,



Victor De la Cruz  
Manatt, Phelps & Phillips, LLP

cc: Ron Turovsky, Esq., Manatt, Phelps & Phillips, LLP  
Todd Nelson, Esq., Manatt, Phelps & Phillips, LLP

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## **Exposure to Alcohol Advertisements and Teenage Alcohol-Related Problems**

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# Exposure to Alcohol Advertisements and Teenage Alcohol-Related Problems

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## KEY WORDS

alcohol advertising, alcohol drinking, adolescent, statistical model

## ABBREVIATIONS

CI—confidence interval

OR—odds ratio

Dr Grenard contributed to the conception of the statistical model, analyzed the data, and prepared the manuscript; Dr Dent contributed to the acquisition of data and analysis of the data, revised the methods and analysis sections of the document, and provided final approval of the manuscript; and Dr Stacy contributed to the conception and design of the study, revised the introduction and discussion sections for intellectual content, and approved the final version of the manuscript.

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**WHAT'S KNOWN ON THIS SUBJECT:** The influence of alcohol advertising on underage drinking has been demonstrated in both cross-sectional and prospective studies. What is not well known is whether this increase in drinking leads to more problems related to alcohol consumption.

**WHAT THIS STUDY ADDS:** Exposure to alcohol advertising and liking of those ads in grade 7 has a significant influence on the severity of alcohol-related problems in grade 10 and that influence is mediated by growth in alcohol use from grades 7 to 9.

## abstract



**OBJECTIVE:** This study used prospective data to test the hypothesis that exposure to alcohol advertising contributes to an increase in underage drinking and that an increase in underage drinking then leads to problems associated with drinking alcohol.

**METHODS:** A total of 3890 students were surveyed once per year across 4 years from the 7th through the 10th grades. Assessments included several measures of exposure to alcohol advertising, alcohol use, problems related to alcohol use, and a range of covariates, such as age, drinking by peers, drinking by close adults, playing sports, general TV watching, acculturation, parents' jobs, and parents' education.

**RESULTS:** Structural equation modeling of alcohol consumption showed that exposure to alcohol ads and/or liking of those ads in seventh grade were predictive of the latent growth factors for alcohol use (past 30 days and past 6 months) after controlling for covariates. In addition, there was a significant total effect for boys and a significant mediated effect for girls of exposure to alcohol ads and liking of those ads in 7th grade through latent growth factors for alcohol use on alcohol-related problems in 10th grade.

**CONCLUSIONS:** Younger adolescents appear to be susceptible to the persuasive messages contained in alcohol commercials broadcast on TV, which sometimes results in a positive affective reaction to the ads. Alcohol ad exposure and the affective reaction to those ads influence some youth to drink more and experience drinking-related problems later in adolescence. *Pediatrics* 2013;131:e369–e379

Alcohol use among adolescents and young adults is a major health concern in the United States. According to a Substance Abuse and Mental Health Services Administration report published in 2004,<sup>1</sup> ~10.9 million (29%) adolescents reported drinking alcohol in the past month, 16.6% reported problem behaviors related to alcohol use, and 6.2% met *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria for substance abuse or dependence.<sup>2</sup> Because of the risks involved, considerable attention has been given to the influence of alcohol advertising on underage drinking. Cross-sectional studies have consistently shown a small but significant association between exposure to alcohol ads and alcohol use.<sup>3-6</sup> More importantly, prospective studies have shown similar findings providing support for a temporal relationship between exposure to ads and alcohol use,<sup>7-13</sup> which has been confirmed in a systematic review of 13 longitudinal studies.<sup>14</sup> Few studies, however, have successfully used prospective data to demonstrate the temporal relationship among exposure to alcohol ads, alcohol consumption, and problem behaviors associated with alcohol use.

The current study examined the effects of alcohol ad exposure on consumption and problem behaviors across 4 years of data collection to test 2 hypotheses. First, the influence of exposure to alcohol ads on underage drinking was hypothesized to interact with an effect modifier (or moderator): an affective reaction to alcohol ads, self-reported as a liking of alcohol ads.<sup>5,15</sup> It was anticipated that adolescents who like alcohol advertisements will be more likely to elaborate on the content of the ads (eg, imagine themselves in the scene), and as a result, they will be more likely to be persuaded to try the product.<sup>16,17</sup> Studies on copy testing by advertisers have shown that liking of advertisements

is predictive of sales for consumer products.<sup>18</sup> In addition, drinking among adolescents and young adults is associated with desirability and identification with characters in alcohol ads<sup>5</sup> and with liking of alcohol ads.<sup>10,19</sup> Second, it was hypothesized that the growth in alcohol use over the first 3 years of the study would significantly mediate the relationship between exposure to alcohol ads in year 1 and alcohol-related problems in year 4 (see paths a and b in Fig 1). That is, effects of Year 1 alcohol ads on the growth in alcohol consumption over time (path a) was expected to translate into later (Year 4) levels of alcohol problems (path b). Figure 1 depicts a conceptual model that incorporates both key hypotheses within a moderated-mediation model.

## METHODS

### Participants

The current data were collected as part of a prospective study on the influence of alcohol advertising on underage drinking.<sup>12,13</sup> Participants recruited from public schools were surveyed during regular school hours from the 7th through 10th grades. Of the 4186 students recruited to participate in the study, 3890 (93% of consented) students completed the survey in at least 1 wave: 2986 (77%) were surveyed in 7th grade, 2849 (73%) in the 8th grade, 2093 (54%) in the 9th grade, and 1609

(41%) in the 10th grade. Dropout in the 9th and 10th grades was largely because of failure of entire schools to remain in the study after initial agreements by the schools to participate. Thus, most dropouts were not because of subject self-selection factors that could confound results. Further, the data analysis (outlined below) thoroughly addresses missing data. A total of 23 public middle schools, randomly selected from all middle schools in Los Angeles County, agreed to participate in the study. The goal was to recruit a sample representative of students attending Los Angeles County high schools.

### Procedures

All seventh grade students in each school at the time of the study were invited to participate. Data collectors visited classrooms to distribute consent and assent forms to students about 2 weeks before administering the surveys. Parents of the students either signed a consent form brought home from school by the student or gave verbal consent to data collectors via telephone if the consent forms were not returned. Students signed assent forms before completing the surveys. The surveys and all procedures were approved by the University of Southern California Institutional Review Board. Students completed paper-and-pencil questionnaires during regular classroom hours at their school.

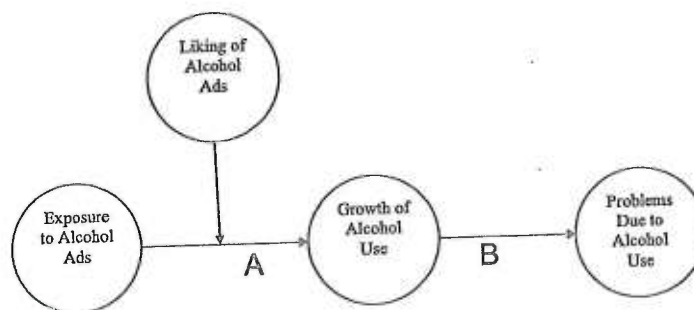


FIGURE 1  
Conceptual model of primary hypothesized paths tested in the moderated-mediation models.



## Outcome Measures

Current alcohol use was assessed with a total of 9 self-report items. Five items<sup>20</sup> assessed on how many days during the past 30 days the participant drank beer, wine, or liquor; drank 3 or more beers in a row; drank 3 or more glasses of wine or liquor; and drank enough to get drunk. An additional 4 items asked how often in the past 6 months participants drank beer, drank wine or wine coolers, drank liquor, or got drunk. An index was formed from all 9 items (coefficient  $\alpha = 0.91$ ). Problems due to alcohol use were assessed with 8 self-report items.<sup>21</sup> Participants indicated how often their alcohol use caused them problems, such as not being able to do their homework, getting into fights, neglecting responsibilities, or causing someone shame or embarrassment. An index score was formed from the 8 items (coefficient  $\alpha = 0.93$ ).

## Independent Variables

Four measures of exposure to alcohol advertising were assessed: (1) Exposure to alcohol advertising on popular shows. Participants indicated how frequently they watched 20 popular TV shows during the past month on a 6-point scale ranging from 1 (never) to 6 (every day). The frequency of watching each show was multiplied by the average frequency of alcohol advertising broadcast on each show during the 10 months before the survey.<sup>22</sup> Data on televised alcohol advertising during the popular shows was purchased from Nielsen Media Research (New York, NY). The weighted items were summed to yield an index score for the number of alcohol ads each participant was exposed to during a typical day of watching popular shows (coefficient  $\alpha = 0.79$ ). This measure of exposure does not directly ask about exposure to alcohol ads, and it has been predictive of alcohol use in past studies.<sup>13,22</sup> (2)

Exposure to alcohol advertising on sports programs. This measure was similar to the popular shows assessment except that it asked about the frequency of watching college and professional sports programs (coefficient  $\alpha = 0.80$ ), which often include a higher frequency of alcohol advertisements than other programming.<sup>23</sup> (3) Memory for alcohol ads: cued recall. Surveys included still pictures captured from TV advertisements including 2 example and 15 test ads.<sup>24</sup> The still pictures extracted from advertisements did not contain brand names or logos. An open-ended item asked participants to write down what product was being advertised. Independent judges coded the responses as being related to the advertisement or not ( $\kappa = 0.88$ ). (4) Self-reported observation of alcohol advertising. Participants were asked 4 items<sup>25</sup> about how often they saw alcohol commercials on TV (coefficient  $\alpha = 0.72$ ).

The survey included 3 items assessing how much participants like alcohol ads on TV.<sup>26</sup> The items assessed whether participants thought that alcohol ads are funny or sexy, and whether they like the alcohol ads better than other ads (coefficient  $\alpha = 0.78$ ). These items measured an affective or emotional reaction to alcohol ads that has been useful in both the study of alcohol advertising<sup>5,15,19</sup> and by the advertising industry in general to estimate the potential effectiveness of advertising copy.<sup>18</sup> Additional covariates associated with advertising exposure, alcohol use, or alcohol-related problems included the amount of time watching television<sup>27,28</sup>; observing friends drinking<sup>29</sup>; observing well-known adults drinking<sup>30</sup>; participating in sports<sup>31</sup>; age, gender, ethnicity, language acculturation<sup>32,33</sup>; and parents' occupation and education (see Appendix for assessments).

## Data Analyses

Construction of the structural equation models used to test the hypotheses

involved 2 steps.<sup>34</sup> First, a measurement model established the simple structure of the model, measurement invariance across gender,<sup>35</sup> and acceptability of parcels as indicators.<sup>36</sup> The second step involved fitting of 4 latent growth-curve models, one for each measure of exposure to alcohol advertising. Goodness-of-fit statistics<sup>37</sup> included the  $\chi^2$  test, Comparative Fit Index, Tucker-Lewis Index, Root Mean Squared Error of Approximation, and the Standardized Root Mean Square Residual. The current analyses used full information maximum likelihood estimation<sup>38</sup> to adjust for uncertainty associated with missing data. Mediation effects (ie, specific and total indirect effects) were assessed using the multivariate  $\delta$  method.<sup>39</sup> This method estimates significance for the product of 2 regression coefficients, the coefficient for the mediator regressed on the predictor and the coefficient for the outcome regressed on the mediator adjusted for the predictor and is consistent with criteria recommended by MacKinnon et al.<sup>40</sup> Mplus<sup>41</sup> was used to fit the measurement and the latent growth models. SEs were adjusted for clustering by school.<sup>41</sup>

## RESULTS

Demographic characteristics for time 1 of the study, as shown in Table 1, indicated that the students in seventh grade were 12.51 (SD = 0.54) years old. Thirteen percent were non-Hispanic whites and 48% were Hispanic. Boys reported significantly more alcohol use than girls for past 30-day use of beer, lifetime bingeing with beer, and past 30 days bingeing with beer, and boys reported more negative consequences as a result of alcohol use. Participants more likely to have been lost to follow-up included those in wave 1 who knew peers (odds ratio [OR] = 1.30; 95% confidence interval [CI] = 1.16–1.44) or adults (OR = 1.13; 95% CI

= 1.05–1.21) who drank alcohol, were exposed to more alcohol commercials on popular shows (OR = 1.28; 95% CI = 1.01–1.61), or were Asian compared with whites (OR = 2.00; 95% CI = 1.30–3.08). There was no difference for those lost to follow-up based on gender, age acculturation, participation in sports, parents' education, lifetime or past 30-day alcohol use, alcohol-related problems, TV viewing, self-reported exposure to advertisements, or liking of alcohol advertisements.

### Measurement Model

The measurement model examined the factor loading, simple structure, and measurement invariance of the latent variables proposed for the models. Indicators loaded well on their hypothesized latent variables in separate models for girls and boys. Examination of a priori hypothesized modification indices for cross-loadings among the alcohol use, alcohol-related problems, ad exposure, and liking of ads target latent factors provided support for a simple structure among the factors. The measurement model findings for the alcohol-related problems factor warranted the use of parcels of indicators in the structural model to provide more stable model estimation.<sup>36,42</sup> Tests for invariance of loadings and thresholds in a multigroup model by gender was adequate to compare structural models across gender.<sup>43</sup> Similar tests for invariance of loadings and thresholds in a multigroup model by grade provided evidence for invariance across time for items measuring alcohol use in the growth curves.

### Latent Growth Models

The latent growth factors for alcohol use over times 1 through 3 and the latent factor for alcohol-related problems were regressed on each of the 4 alcohol ad exposure measures in 4 separate series of model evaluations.

TABLE 1 Demographic Information for Participants in Seventh Grade

Item	Total	Girls	Boys
Gender, <i>n</i> (%)	3890 (100)	1905 (50.14)	1894 (49.86)
Age, mean (SD)	12.51 (0.54)	12.51 (0.54)	12.51 (0.53)
Ethnicity, <i>n</i> (%)			
White/non-Hispanic	520 (13.37)	261 (13.78)	259 (13.60)
Hispanic	1862 (47.87)	937 (49.47)	923 (48.45)
Asian	662 (17.02)	324 (17.11)	338 (17.74)
Black/African American	120 (3.08)	56 (2.96)	64 (3.36)
Native Hawaiian or Pacific Islander	30 (0.77)	15 (0.79)	15 (0.79)
American Indian or American Native	37 (0.95)	17 (0.90)	20 (1.05)
Don't know	491 (12.62)	196 (10.35)	206 (10.81)
Mixed	168 (4.32)	88 (4.65)	80 (4.20)
Language acculturation, mean (SD)	4.22 (0.76)	4.14 (0.79)	4.28 (0.72)
At least 1 drink of beer in lifetime, <i>n</i> (%)			
0 d	1595 (56.94)	842 (59.21)	753 (54.60)
1 d	532 (18.99)	260 (18.28)	272 (19.72)
2 d	242 (8.64)	123 (8.65)	119 (8.63)
3 to 9 d	216 (7.71)	101 (7.10)	115 (8.34)
10 to 19 d	86 (3.07)	39 (2.74)	47 (3.41)
20 to 39 d	50 (1.79)	24 (1.69)	26 (1.89)
40 to 99 d	30 (1.07)	15 (1.05)	15 (1.09)
100 or more days	50 (1.79)	18 (1.27)	32 (2.32)
At least 1 drink of beer in past 30 days, <i>n</i> (%) <sup>a</sup>			
0 d	2414 (83.18)	1243 (84.44)	1171 (81.89)
1 d	281 (9.68)	140 (9.51)	141 (9.86)
2 d	90 (3.10)	40 (2.72)	50 (3.50)
3 to 5 d	55 (1.90)	20 (1.36)	35 (2.45)
6 to 9 d	27 (0.93)	16 (1.09)	11 (0.77)
10 to 19 d	9 (0.31)	6 (0.41)	3 (0.21)
20 to 29 d	6 (0.21)	3 (0.20)	3 (0.21)
All 30 d	20 (0.69)	4 (0.27)	16 (1.12)
At least 1 drink of wine or liquor in lifetime, <i>n</i> (%)			
0 d	1799 (64.67)	934 (66.15)	865 (63.14)
1 d	455 (16.36)	215 (15.23)	240 (17.52)
2 d	210 (7.55)	113 (8.00)	97 (7.08)
3 to 9 d	153 (5.50)	78 (5.52)	75 (5.47)
10 to 19 d	69 (2.48)	33 (2.34)	36 (2.63)
20 to 39 d	40 (1.44)	17 (1.20)	23 (1.68)
40 to 99 d	23 (0.83)	0 (0.64)	14 (1.02)
100 or more days	33 (1.19)	13 (0.92)	20 (1.46)
At least 1 drink of wine or liquor in past 30 days, <i>n</i> (%)			
0 d	2422 (83.81)	1246 (85.05)	1176 (82.53)
1 d	272 (9.41)	124 (8.46)	148 (10.39)
2 d	105 (3.63)	54 (3.69)	51 (3.58)
3 to 5 d	34 (1.18)	17 (1.16)	17 (1.19)
6 to 9 d	23 (0.80)	14 (0.96)	9 (0.63)
10 to 19 d	10 (0.35)	5 (0.34)	5 (0.35)
20 to 29 d	6 (0.21)	2 (0.14)	4 (0.28)
All 30 d	18 (0.62)	3 (0.20)	15 (1.05)
3 or more drinks of beer in a row in lifetime, <i>n</i> (%) <sup>a</sup>			
0 d	2432 (88.12)	1258 (89.92)	1174 (86.26)
1 d	134 (4.86)	61 (4.36)	73 (5.36)
2 d	70 (2.54)	33 (2.36)	37 (2.74)
3 to 9 d	45 (1.63)	13 (0.93)	32 (2.35)
10 to 19 d	26 (0.94)	13 (0.93)	13 (0.96)
20 to 39 d	25 (0.91)	14 (1.00)	11 (0.81)
40 to 99 d	8 (0.29)	2 (0.14)	6 (0.44)
100 or more days	20 (0.72)	5 (0.36)	15 (1.10)
3 or more drinks of beer in a row in past 30 days, <i>n</i> (%) <sup>a</sup>			
0 d	2688 (92.91)	1383 (94.40)	1305 (91.39)
1 d	105 (3.63)	47 (3.21)	58 (4.06)
2 d	34 (1.18)	14 (0.96)	20 (1.40)
3 to 5 d	25 (0.86)	9 (0.61)	16 (1.12)

TABLE 1 Continued

Item	Total	Girls	Boys
6 to 9 d	11 (0.38)	5 (0.34)	6 (0.42)
10 to 19 d	7 (0.24)	3 (0.20)	4 (0.28)
20 to 29 d	6 (0.21)	2 (0.14)	4 (0.28)
All 30 d	17 (0.59)	2 (0.14)	15 (1.05)
3 or more drinks of wine or liquor in lifetime, <i>n</i> (%)			
0 d	2448 (89.15)	1263 (90.67)	1185 (87.58)
1 d	135 (4.92)	55 (3.95)	80 (5.91)
2 d	58 (2.11)	31 (2.23)	27 (2.00)
3 to 9 d	43 (1.57)	20 (1.44)	23 (1.70)
10 to 19 d	20 (0.73)	9 (0.65)	11 (0.81)
20 to 39 d	17 (0.62)	7 (0.50)	10 (0.74)
40 to 99 d	6 (0.22)	2 (0.14)	4 (0.30)
100 or more days	19 (0.69)	6 (0.43)	13 (0.96)
3 or more drinks of wine or liquor in past 30 days, <i>n</i> (%)			
0 d	2707 (93.73)	1384 (94.60)	1323 (92.84)
1 d	92 (3.19)	43 (2.94)	49 (3.44)
2 d	30 (1.04)	16 (1.09)	14 (0.98)
3 to 5 d	18 (0.62)	10 (0.68)	8 (0.56)
6 to 9 d	13 (0.45)	4 (0.27)	9 (0.63)
10 to 19 d	7 (0.24)	2 (0.14)	5 (0.35)
20 to 29 d	6 (0.21)	2 (0.14)	4 (0.28)
All 30 d	15 (0.52)	2 (0.14)	13 (0.91)
Consequences of alcohol use, mean (SD) <sup>b</sup>	0.09 (0.41)	0.08 (0.38)	0.11 (0.44)

<sup>a</sup> Alcohol use by student gender was significant for past 30-days use of beer, lifetime bingeing with beer, and past 30-days bingeing with beer (all  $\chi^2(7) > 14.07, P < .05$ ), but all other comparisons of alcohol use by student gender were nonsignificant (all  $P > .05$ ).

<sup>b</sup> Consequences of alcohol use differed by gender ( $t(2648) = -2.15, P < .05$ );  $P =$  proportion.

The hypothesized moderator, liking of alcohol ads, was included in each of the 4 models. In addition, the growth factors were simultaneously regressed on covariates measured at time 1, including age, observing peers drink, observing adults drink, playing sports, general TV watching, language acculturation, and socioeconomic status (occupation and education of each participant's parents). All structural growth models differed by gender, so only those results for multigroup models by gender are presented here.

As shown in Table 2 and Fig 2, the coefficient for the intercept regressed on the interaction term was significant for boys and for girls. Figure 3 depicts this interaction illustrating that the level of exposure to ads was more predictive of alcohol use in seventh grade for those students who reported a greater liking of alcohol ads. There was no interaction in the prediction of the slope for the latent growth for alcohol use.

Significant mediation effects or indirect effects were observed among girls for the path from exposure to ads on popular shows at time 1 through the growth curve slopes to problems at time 4 ( $\delta$  method indirect effect:  $ab = 0.091, P = .02$ ) and for the path from liking of ads at time 1 through the growth curve intercepts to problems at time 4 ( $ab = 0.105, P = .03$ ). Among boys, there was a significant total effect of the interaction term for popular shows and liking of ads at time 1 on problems at time 4, which included the direct effect on time 4 problems and indirect effects through the intercept and slope ( $\delta$  method total effect:  $b = 0.164, P = .02$ ). These effects among girls and boys were significant even after adjustment for time 1 problems, age, friends drinking, adults drinking, playing sports, general TV watching, acculturation, parents' jobs, parents' education, and clustering by school.

The covariates, alcohol-related problems at time 1 and friends and close

adult drinking at time 1, were significant predictors of the intercept for girls. The same covariates plus language acculturation and parent jobs were significant predictors of the intercept for boys. For boys, drinking by friends and language acculturation were significant predictors of the slope, and the sign of the coefficients for these predictors changed between the intercept and the slope, suggesting that those higher in alcohol use at time 1 might have had lower growth rates than those lower in use at time 1. None of the time 1 variables were significant direct-effect (unmediated) predictors of alcohol-related problems at time 4 for boys or girls.

Mediation models for the other 3 exposure measures (frequency of watching sports show, cued recall of ads, and self-reported frequency of seeing alcohol ads) fit the data very well (results not shown). In all 3 models for girls, the intercept for the growth of alcohol use mediated the influence of liking of alcohol ads at time 1 on alcohol-related problems at time 4. No other indirect effects were significant for girls or boys. In these 3 mediation models for girls, both the intercept and slope for the growth of alcohol use were positive predictors of the level of alcohol-related problems at time 4, whereas this was not the case for boys.

## DISCUSSION

This study provides evidence supporting the hypothesis that exposure to alcohol advertising and affective reactions to those advertisements on television influence underage drinking and the development of alcohol-related problems. The growth of alcohol use from the seventh through the ninth grades is predicted by the frequency of watching popular shows and self-reports on the liking of alcohol ads. In partial support of hypothesis 1, there

is a significant interaction between exposure to ads and liking of ads in the prediction of the intercept (but not the slope) for a growth curve modeled across these grade levels for both male and female students. The interaction shows that the level of exposure to ads is more predictive of a higher level of alcohol use in seventh grade for those students who report a greater liking of alcohol ads. In addition to this interaction observed at time 1, the frequency of watching popular shows at time 1 predicts the slope for the growth of alcohol use for girls, and the liking of alcohol ads at time 1 predicts the slope for boys.

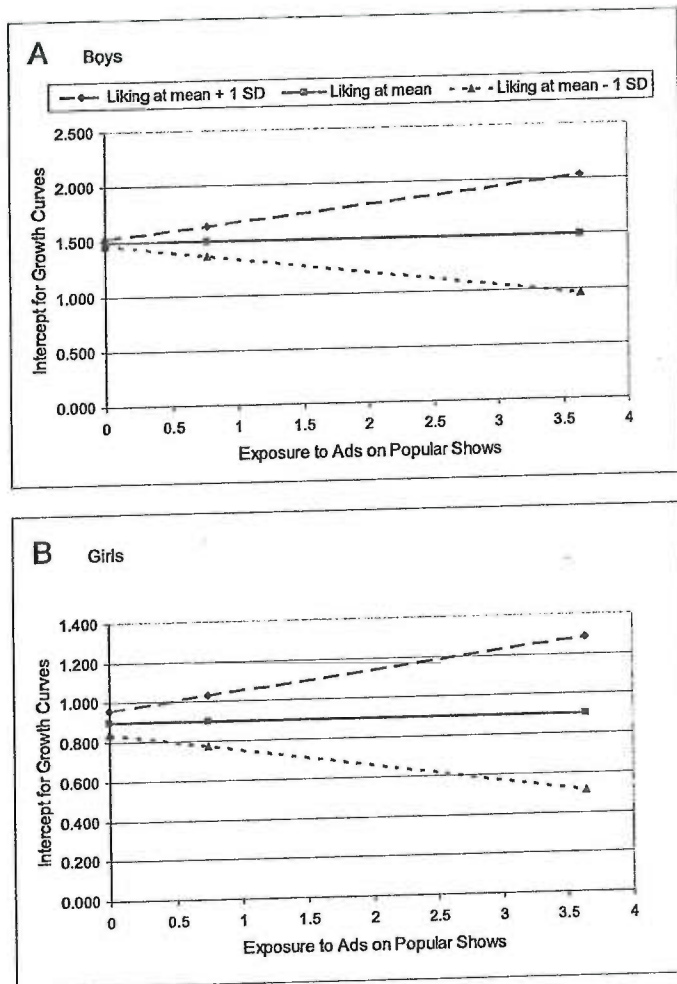
In support of hypothesis 2, the mediation model shows that the influence of alcohol ads at time 1 on the occurrence of alcohol-related problems at time 4 is mediated by the growth of alcohol use. Among girls, there was a significant indirect effect of exposure to ads on popular shows in time 1 on problems in time 4 through the growth of alcohol use, and among boys, there was a significant total effect from the shows and liking interaction term in time 1 to problems in time 4. These relationships are significant even after adjusting for a range of other covariates measured at time 1 that are known to be associated with alcohol use. The other 3 measures of exposure to alcohol advertising show similar findings, although these measures are somewhat less predictive of the growth in alcohol use and alcohol-related problems.

Although causality cannot be verified in 1 observational study, the relevant theories and empirical evidence from the current prospective study and previous research are consistent with possible causal effects linking alcohol advertising to underage alcohol use and alcohol-related problems. In the current study, measures of exposure at time 1 are associated with the increasing use of alcohol over time and the

TABLE 2 Standardized Parameter Estimates for the Mediation Model

	Girls		Boys	
	Parameter Estimate	SE	Parameter Estimate	SE
Intercept on				
T1 alcohol use	0.759***	0.046	0.821***	0.038
T2 alcohol use	0.590***	0.060	0.643***	0.047
T3 alcohol use	0.466***	0.056	0.506***	0.030
Slope on				
T1 alcohol use	0.000	0.000	0.000	0.000
T2 alcohol use	0.404***	0.036	0.349***	0.057
T3 alcohol use	0.640***	0.056	0.549***	0.101
T4 alcohol-related problems on				
T4 problems 1	0.707***	0.029	0.720***	0.035
T4 problems 2	0.692***	0.039	0.721***	0.056
T4 problems 3	0.705***	0.038	0.736***	0.048
T4 problems 4	0.734***	0.050	0.780***	0.037
Intercept on T1 predictors				
Popular shows	-0.052	0.034	-0.027	0.031
Liking of ads	0.267***	0.047	0.171***	0.028
Shows x Liking	0.091*	0.042	0.093*	0.046
T1 problems	0.297*	0.123	0.264**	0.084
Age	0.030	0.031	0.040	0.030
Peer drinking	0.426***	0.060	0.539***	0.052
Playing sports	0.006	0.045	-0.009	0.024
Adult drinking	0.155***	0.036	0.138**	0.053
General TV viewing	0.012	0.034	0.012	0.037
Language acculturation	0.050	0.042	-0.098*	0.040
Parents' jobs	0.000	0.041	0.112*	0.046
Parents' education	-0.041	0.045	-0.002	0.030
Slope on T1 predictors				
Popular shows	0.190**	0.058	0.113	0.063
Liking of ads	-0.021	0.078	0.129*	0.060
Shows x Liking	-0.083	0.068	-0.112	0.081
T1 problems	-0.125	0.135	0.076	0.156
Age	-0.125	0.135	0.076	0.156
Peer drinking	0.031	0.039	-0.075	0.068
Playing sports	0.057	0.075	-0.483***	0.128
Adult drinking	-0.137	0.073	-0.015	0.074
General TV viewing	-0.029	0.067	-0.103	0.119
Language acculturation	-0.029	0.064	-0.059	0.062
Parents' jobs	0.029	0.073	0.227*	0.097
Parents' education	0.130	0.075	-0.135	0.109
T4 alcohol-related problems on				
Intercept	0.393*	0.166	0.177	0.303
Slope	0.478***	0.106	0.179	0.214
Popular shows	-0.054	0.065	-0.007	0.058
Liking of ads	-0.102	0.064	-0.095	0.062
Shows x Liking	0.040	0.072	0.167	0.094
T1 problems	0.050	0.070	0.014	0.090
Age	0.036	0.049	-0.004	0.034
Peer drinking	-0.022	0.085	0.234	0.214
Playing sports	-0.022	0.059	0.027	0.044
Adult drinking	0.050	0.041	0.021	0.074
General TV viewing	-0.027	0.062	-0.021	0.063
Language acculturation	0.022	0.062	-0.021	0.063
Parents' jobs	0.022	0.062	-0.021	0.063
Parents' education	0.013	0.063	-0.048	0.086
Intercepts for latent factors				
Problems with alcohol at T4	-0.003	0.103	0.061	0.092
Growth curve intercept	0.006	0.064	-0.018	0.100
Growth curve slope	0.006	0.064	-0.018	0.100
Residual variances				
T4 problems 1	0.500***	0.041	0.482***	0.050





**FIGURE 3** Interaction of exposure to ads with liking of ads. Liking of ads plotted at the mean, the mean plus 1 SD, and the mean minus 1 SD.

portrayals of alcohol use in advertisements, which, in turn, predicts liking of brands of beer and positive expectancies for alcohol use. The overall influence of liking of advertisements on alcohol use might be somewhat larger in the current model if these mediating pathways were taken into account. In another study of advertising, Austin et al<sup>46</sup> found that a media-literacy intervention increased skepticism (reduced liking) for advertising, as expected, but also increased recall of advertisement. This is consistent with the current study where memory and

liking of advertisements interact. That is, a greater memory for alcohol advertisement does not necessarily mean an increase in alcohol use; it also depends on liking of the advertisements. This combination of theory and empirical evidence across research teams provides reasonably good support for the influence of exposure to alcohol advertisements on alcohol use and alcohol-related problems among adolescents.

A few limitations warrant discussion. First, the current results may be generalized only to public school students

in the Los Angeles area. Second, alcohol use measures among young adolescents are often skewed toward 0, and this is true in the current sample. Seventh graders were actually recruited because of their low levels of alcohol use to examine the early development of alcohol use, but, unfortunately, these skewed measures may have contributed, in part, to some of the null findings in this study. Finally, not all results converge across multiple measures of exposure to advertising, but there is little literature available that indicates which exposure measures are optimal. However, it may not be surprising that cued recall of advertisements was not predictive of alcohol use. In the communication theory of Lang,<sup>47</sup> cued recall is thought to be a less effective measure of retrieval/accessibility of information than it is a measure of encoding/availability of information.<sup>47</sup> In encoding specificity<sup>48</sup> and transfer-appropriate processing<sup>49</sup> views, cued recall would reflect good accessibility and predictability at the time of drinking decisions only if the retrieval cues at test overlap well with retrieval cues during these later decisions; such overlap is unlikely, as the test cues were still pictures of commercials. However, the use of the indirect measure of exposure on popular shows and liking of ads are used successfully across a range of studies, and, in particular, liking of ads, although not strictly a measure of exposure, is used across product categories to predict the success of individual ads or ad campaigns.<sup>18</sup>

## CONCLUSIONS

The accumulation of evidence for the influence of televised alcohol advertisements on underage drinking has important implications for prevention. First, children can be taught about the design of persuasive messages in the media early to help them avoid undue

influence by the media on their behaviors.<sup>45,50</sup> Second, it is important to have a comprehensive policy to limit the exposure of children to alcohol ads on television and on other media, such as the Internet, print media, and display ads. Although there are other influences on

underage drinking, including those of peers and adults, prevention strategies should address the influence of alcohol ads as part of an overall strategy to prevent early initiation of alcohol use and the development of problems related to consumption.

## ACKNOWLEDGMENTS

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## APPENDIX Assessments

Assessment	Items	$\alpha$	Example Item	Response Option Anchors
Current frequency and quantity of alcohol use <sup>20</sup>	9	0.91	During the last 30 d, on how many days did you...have at least 1 drink of beer?	0 = 0 d 7 = all 30 d
Problems associated with alcohol use <sup>21</sup>	8	0.93	How many times have you ever...gone to school drunk?	1 = never 4 = more than 10 times
Exposure to alcohol advertising <sup>a</sup> on popular shows <sup>22</sup>	20	0.79	How frequently do you watch MTV?	1 = never 6 = every day
Exposure to alcohol advertising <sup>a</sup> on sports shows <sup>22,23</sup>	6	0.80	How often to you watch professional football?	1 = never 6 = every day
Cued recall memory for alcohol advertisements <sup>24</sup>	15	0.74	What product is being advertised in the photo?	Open-ended
Self-reported observation of alcohol advertisements <sup>25</sup>	4	0.72	In the past week, how many commercials have you seen for alcohol drinks like beer, wine, or liquor?	0 = none 6 = 6 or more
Liking of alcohol advertisements <sup>26</sup>	3	0.78	Of all the commercials you see on TV, how much do you like the TV commercials for alcohol?	1 = I like alcohol commercials the most 4 = I like the alcohol commercials the least
Propensity to watch TV <sup>27,28</sup>	7	0.79	On a typical weekday, how many hours a day do you watch TV...after school before dinner?	1 = I do not watch TV 5 = 5 h or more
Observed drinking by peers and friends <sup>29</sup>	4	0.86	About how often did you do the following things in the last 6 mo...saw someone your age drink beer or other alcohol?	0 = never 6 = every day
Observed drinking by known adults <sup>30</sup>	3	0.84	About how often did you do the following things in the last 6 mo...saw an adult you know well drink alcohol?	0 = never 6 = every day
Participation in sports <sup>31</sup>	5	0.73	About how often did you do the following things in the last 6 mo... played soccer?	0 = never 6 = every day
Language acculturation <sup>32,33</sup>	3	0.67	What language(s) do you usually speak at home?	1 = only English 5 = only another language
Socioeconomic status <sup>51</sup>	2	na	What is the highest grade completed by your mother?	1 = not completed elementary school 6 = Completed graduate school
Socioeconomic status <sup>51</sup>	2	na	What type of work does your father do?	Open-ended (coded)

na, not applicable.

<sup>a</sup> The frequency of watching popular shows or sports programs was weighted by the frequency of alcohol advertisements broadcast on those shows in the previous 10 mo, as reported by Nielsen Media Research (see text).



August 26, 2014

**Karen Dial**  
H.B. Drollinger Co.  
President

**John Ruhlen**  
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**Donald R. Duckworth**  
Executive Director

City of Los Angeles  
Planning and Land Use Management Committee  
200 N Spring Street, Room 350  
Los Angeles, California 90012

Re: Case No. CPC-2011-1964-SN  
Los Angeles International Airport (LAX) Sign District

Honorable Committee Members:

On behalf of the members of the Westchester Business Improvement Association, the entire neighborhood commercial district located north of LAX to Manchester Avenue, this letter is written to express the Business Improvement District's support for the proposed Sign District at LAX. The proposed district dovetails nicely with the airport's on-going modernization, including other efforts related to signage.

This proposal would allow for well-designed signage that enhances the visual environment at the airport. As part of the airport's overall vision, we hope it will also result in the removal of old, static billboards outside the airport and the addition of new and upgraded way-finding signage for travelers coming to and from the airport.

We believe this district will make the airport a more-visually appealing place for visitors and locals, replacing blank walls and static, boring signage with 21<sup>st</sup> Century LED lighting and digital display signs that will engage the traveler.

We urge you to support this project.

Thank you,

Donald R. Duckworth,  
Executive Director

C: WBIA Board of Directors



**Streetscape Improvement Association**

Beautify and improve local streetscapes, resulting in a better environment  
for both the commercial and residential areas of Westchester

August 25, 2014

City of Los Angeles  
Planning and Land Use Management Committee  
200 N Spring Street, Room 350  
Los Angeles, California 90012

Re: Case No. CPC-2011-1964-SN  
Los Angeles International Airport (LAX) Sign District

Dear PLUM Committee Members:

As president of the Westchester Streetscape Improvement Association, I hear negative opinions about what the airport is planning on a number of fronts, but the proposed Sign District project is good for everyone.

Not only will it help update and enhance a signage program rooted in the 1980s, but it will also allow the airport to focus its signage within the airport and reduce the need for signage out in the community.

I have seen signage like the signage LAX is proposing here at other airports around the country, and I can only say that if we intend for LAX to be a world-class airport, we have to allow the airport to create world-class signage.

WSIA has spent many years trying improve the experience for visitors coming to and from LAX, and we are confident that the Sign District will do the same for those visitors inside the airport itself.

We hope you will allow the airport to move forward on this project quickly.

Sincerely,

A handwritten signature in black ink that reads "John Ruhlen". The signature is written in a cursive style.

John Ruhlen,  
President



**Jack Davis**  
6386 W. 79<sup>th</sup> Street  
Westchester, Ca 90045

August 25, 2014

City of Los Angeles  
Planning and Land Use Management Committee  
200 N Spring Street, Room 350  
Los Angeles, California 90012

Re: Case No. CPC-2011-1964-SN  
Los Angeles International Airport (LAX) Sign District

Honorable Committee Members:

My name is Jack Davis, and I am the immediate past Chairman of the Board of Managers for the Westchester Family YMCA. I am also active on a number of other community based organizations.

As community members, we often hear bad things about the airport, but this Sign District proposal is good for everyone. Not only will it help update and enhance a signage program rooted in the 1980s, but it will also allow the airport to focus its signage within the airport and reduce the need for signage out in the community.

I have seen signage like that which is being proposed at LAX at other airports around the country, and I can only say that if we intend for LAX to be a world-class airport, we have to allow it to create world-class signage.

I encourage you to support this proposal. Thank you.

Sincerely,

  
Jack Davis

#1

# Coalition to Ban Alcohol Ads on Public Property in Los Angeles

August 26, 2014

Los Angeles City Council Planning and Land Use Committee  
Councilman Jose Huizar, Chair  
Councilman Mitchell Englander  
Councilman Gilbert Cedillo  
City Hall

**Re: Council file# 13-0285-S2 -- LAX sign district**

Honorable Committee Members,

Attached are letters and studies, from very credible sources, that show the harmful effects alcohol advertising has on children and young adults. Especially when the exposure starts at an early age. Also a picture of alcohol advertising at a Boston train station and a report on the cost of harm caused by over consumption of alcohol in the County of Los Angeles.

Alcohol Ads at Boston Railway Station  
It's the kind of thing we could see at LAX unless  
there's an alcohol ad ban.

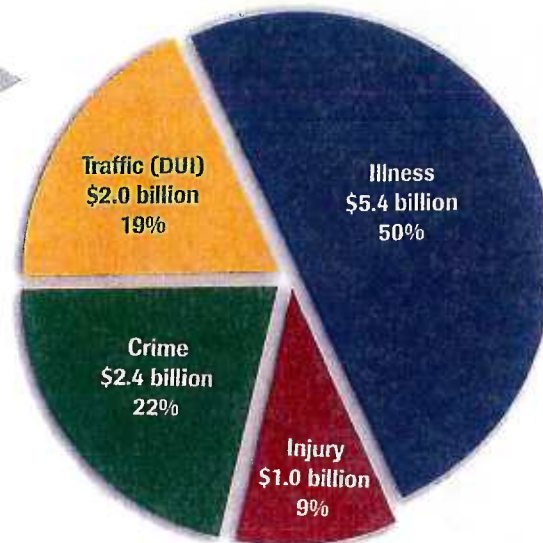


# The Annual Catastrophe of Alcohol in California — Los Angeles County —

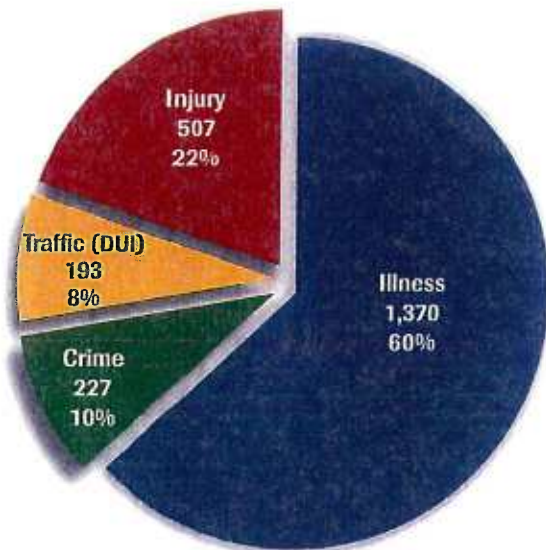
A MARIN INSTITUTE REPORT

## The price tag for alcohol in LA County

- The total economic cost of alcohol use is \$10.8 billion annually
- This translates to roughly \$1000 per LA County resident or \$3,100 per family each year



Total: \$10.8 billion



Total: 2,297

## How alcohol causes death in LA County

- Total number of lives lost each year to alcohol use is 2,297
- Six people die each day due to alcohol use
- The total number of incidents related to alcohol use is over 240,000
- There are 28 incidents (injuries, crimes, high-risk sex, etc.) every hour due to alcohol use



24 Belvedere Street • San Rafael, California 94901 • 415 456-5692  
[www.marininstitute.org](http://www.marininstitute.org)



## Youth Still Harassed by Alcohol Ads On America's Public Transit



Alcohol Justice logo. (PRNewsFoto/Alcohol Justice)

### *New Alcohol Justice Study Shows Slow Progress on Alcohol Advertising Bans on Buses, Trains & Public Property*

LOS ANGELES, Oct. 25, 2013 /PRNewswire-USNewswire/ -- America's kids are still being lured to drink by seductive alcohol ads in larger metropolitan areas on public transit. This was a finding in a new survey released today by Alcohol Justice at a press conference in Los Angeles and available at [www.AlcoholJustice.org](http://www.AlcoholJustice.org). The report looks at the alcohol advertising policies and contracts of 32 metropolitan transit agencies and cities, including L.A. and Boston where advocates are making progress in fighting alcohol ads. Actor Kurtwood Smith hosted the press conference on the steps of Los Angeles City Hall where Councilmember Paul Koretz is championing a proposed ordinance banning alcohol ads on city property.

(Photo: <http://photos.prnewswire.com/prnh/20131025/DC04391>)

(Logo: <http://photos.prnewswire.com/prnh/20110727/DC41105LOGO>)

*"The scientific research linking exposure to alcohol advertising with influencing underage drinking and leading to alcohol-related problems is well-documented,"* stated Sarah Mart, report co-author and Research Director at Alcohol Justice. *"To reduce the harm, we recommend alcohol ads on public property should be banned – including buses, trains and street furniture."*

The report, *"These Bus Ads Don't Stop For Children: Alcohol Advertising on Public Transit,"* found that 18 of 32 agencies clearly prohibit alcohol ads, while 9 of the 14 remaining agencies have partial limits on alcohol ads. Some of the biggest cities like Los Angeles, Chicago, Atlanta, Dallas and New York still allow alcohol ads. Apparently outcry from parents and child



advocates is not being heard over the buzz of advertising firms and alcohol promoting ad revenue.

The report finds that the economic justifications at the transit agencies under scrutiny, as only .03% to .10% of operating revenue is from alcohol ads and ad revenue is from alcohol ads.

*"Alcohol ad revenue is less than ten percent of total advertising and on total operating revenue for these agencies," stated Bruce Lee Livingstone, CEO at Alcohol Justice. "To save less than a penny from each rider's fare are exposing millions of underage youth to alcohol ads and contributing to addiction costs for youth."*

The press conference brought together the Los Angeles-based coalition led by Los Angeles City Councilmember [Paul Koretz](#) (5<sup>th</sup> District), who has teamed with council member Richard Alarcon in guiding an ordinance through city council to extend an existing bus bench alcohol ad ban to other LA Metropolitan Transportation Authority bus shelters and street furniture.

Kurtwood Smith, of *"RoboCop," "That 70's Show,"* and a new ABC television production called *"Resurrection,"* stated *"America should not tolerate kid advertisements luring them towards a lifetime of drinking."*

According to the [new report](#), advertising on transit vehicles and transit shelters is part of the out-of-home market in the U.S. in 2012. Street furniture such as bus shelters is also considered transit advertising. Whether this type of alcohol advertising continue to grow, or be eliminated is an ongoing public policy debate.

*"Alcohol advertising has a destructive effect on community health and safety," stated David Weissman, President of [Public Citizen](#). "Governments must act by passing an ordinance to ban alcohol advertising out of public transit systems."*

U.S. trade associations like DISCUS, Beer Institute and Wine Institute, and producer corporations like, Diageo, Anheuser-Busch InBev and CBS are calling for an end of government for profits at public expense with self-regulatory guidelines, restrictions and loosening existing bans on alcohol advertising.

*"Local government should stop being a quiet collaborator with the liquor industry that consistently promotes alcohol consumption in our city," stated Ruben F. Salazar, Executive Director of [Coalition to Ban Alcohol Ads on Public Property in L.A.](#) "The city council's ban alcohol ads on city owned property to protect impressionable youth from being encouraged to drink their toxic products."*

*"Young people may take those first drinks for a number of reasons, including also including being exposed to advertising hyping the supposed allurements of alcohol," stated Councilmember Koretz. "That's why it's so important that we not be a bystander, so I am very pleased to be supporting the proposed city ordinance that bans alcohol ads on city-owned and controlled property, including the bus shelters used daily. I call on all my fellow councilmembers to support this key motion and to"*



**JONATHAN E. FIELDING, M.D., M.P.H.**  
Director and Health Officer

**JONATHAN E. FREEDMAN**  
Chief Deputy Director

313 North Figueroa Street, Room 806  
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August 10, 2012

The Honorable Richard Alarcón  
Councilmember, Seventh District  
City of Los Angeles  
200 North Spring Street, Room 470  
Los Angeles, California 90012

Dear Councilmember Alarcón:


Thank you for your recent letter requesting the Los Angeles County Department of Public Health (DPH) provide input on the potential impact that your proposed legislation prohibiting alcohol ads on city owned and controlled property – Los Angeles City Council File: 11-1429, may have on protecting children from the high risk behaviors associated with alcohol advertising. The proposed ordinance is in alignment with the current County of Los Angeles Code banning alcohol advertising on County owned or operated properties which is detailed in Attachment II to this correspondence.

Recent data on alcohol use details the linkage between alcohol advertising and alcohol abuse in young people. Attachment I provides a summary of scientific literature and data on this subject. Also, a brief summary of current laws restricting alcohol advertising is provided for your reference in Attachment II.

Reducing the impact of alcohol marketing on young people is an important public health goal. As the literature indicates, underage drinking is a significant contributor to youth alcohol-related motor vehicle crashes and other forms of injury, violence, suicide, and problems associated with school and family.<sup>1</sup>

DPH supports efforts to curb alcohol abuse by youth and welcomes the opportunity to assist the City of Los Angeles as it seeks to implement measures to protect the County's most vulnerable population.

Sincerely,

  
Jonathan E. Fielding, MD, MPH  
Director and Health Officer

JEF:jv:dkl

Attachments

## Attachment I – Alcohol Use in Minors

### Alcohol Industry Advertising

In a May 2012 publication entitled, *"State Laws to Reduce the Impact of Alcohol Marketing on Youth: Current Status and Model Policies,"* the Center on Alcohol Marketing and Youth, at the Johns Hopkins University Bloomberg School of Public Health reported the following advertising efforts made by the alcohol industry:

- The alcohol industry spent more than \$4 billion each year marketing its projects.<sup>ii</sup>
- Underage youth receive substantial exposure to this marketing, and multiple longitudinal studies have correlated this exposure with greater likelihood of drinking, or if young people have already initiated alcohol use, drinking more.<sup>iii</sup>

The Marin Institute in its March 2009 publication entitled, *"Out-of-Home Alcohol Advertising: A 21<sup>st</sup>-Century Guide to Effective Regulation,"*<sup>iv</sup> cited the following:

- Spending on out-of-home advertising grew to over \$8 billion dollars in 2008.
- The term out-of-home advertising has replaced "outdoor advertising" because advertisers are no longer just using billboards and signs to reach consumers; some of the newer techniques, such as video display terminals, are placed indoors.
- High-tech out-of-home advertisements such as digital billboards, video networks, and digital ads on buses were expected to grow to over \$2.65 billion in 2009.
- Historically, the alcohol industry has been one of the largest purchasers of outdoor advertising.
- Since 2006, the alcohol industry increased total advertising spending 4.8 percent to total 2.2 billion.

### Prevalence and Toll of Underage Drinking in America

In a September 2003 report brief entitled, *"Reducing Underage Drinking: A Collective Responsibility,"* the National Research Council and Institute of Medicine of the National Academies reported that the prevalence and toll of underage drinking in America is widely underestimated: it costs the nation a conservatively estimated \$53 billion annually.<sup>v</sup>

### Link Between Ads and Minor Consumption

In another March 2006 publication entitled, *"Underage Drinking in the United States: A Status Report 2005,"* the Center on Alcohol Marketing and Youth cited that youth exposure to alcohol advertising is substantial as demonstrated through the following studies:

- Long-term studies have shown that youth who see, hear, and read more alcohol ads are more likely to drink and drink more heavily than their peers.<sup>vi</sup>
- The first national long-term study of youth throughout the United States, funded by the National Institute on Alcohol Abuse and Alcoholism, found that for underage youth, exposure to an additional alcohol ad was correlated with a 1 percent increase in drinking, and that youth drank 3 percent more for every additional dollar per capita spent on alcohol advertising in a local market.<sup>vii</sup>
- This study comes on the heels of two other long-term federally-funded studies as well as a variety of studies from other countries that, taken together, present an increasing compelling picture that alcohol marketing has an effect on young people's drinking.<sup>viii</sup>

- A study of 2,250 middle-school students in Los Angeles found that a one standard deviation increase in exposure to television programs containing alcohol commercials in seventh grade was related to a 1.4-fold increase in the likelihood of beer consumption, a 1.3-fold increase in wine/spirits consumption, and a 1.3-fold increase in consuming at least three drinks in a row one year later.<sup>ix</sup>
- Another study of middle-school students in South Dakota found that exposure in seventh grade to beer advertising via magazines, concession stands at sporting and music events, and in-store displays, but not television, predicted frequency of drinking in ninth grade.<sup>x</sup>
- Numerous long-term studies in other countries have found as well that youth who see, hear, and read more alcohol ads are more likely to drink and drink more heavily than their peers.<sup>xi</sup>
- A study of 253 10 to 17 year olds in California found that specific elements of beer ads (such as humor or use of animal characters) significantly contributed to how much the young people liked the ads, which in turn increased these young people's intentions to purchase the product and beer brand promoted by these advertisements. In contrast, ads that focused on product-related characteristics or sent a message about the minimum drinking age reduced young people's desire to purchase the product associated with them.<sup>xii</sup>

#### **Alcohol Use Among Young People Under 21 is a Leading Drug Problem in the United States**

- More youth in the United States drink alcohol than smoke tobacco or marijuana, making it the drug most used by American young people.<sup>xiii</sup>
- Every day, 5,400 young people under 16 take their first drink of alcohol.<sup>xiv</sup>
- In 2005, one out of six eighth-graders, one in three tenth-graders, and nearly one out of two twelfth-graders were current drinkers.<sup>xv</sup>
- More than 7 million underage youth, ages 12 to 20, reported binge drinking – having five or more drinks on at least one occasion in the past 30 days – in 2004, according to data released in September 2005.<sup>xvi</sup>

#### **Underage Drinking has Serious Consequences**

- The Centers for Disease Control and Prevention estimates that 4,571 deaths of youth under age 21 were attributable to excessive alcohol use in 2001.<sup>xvii</sup>
- Recent studies have found that heavy exposure of the adolescent brain to alcohol may interfere with brain development, causing loss of memory and other skills.<sup>xviii</sup>

#### **Alcohol is Used More by Young People than Tobacco or Marijuana**

- More youth in the United States drink alcohol than smoke tobacco or marijuana, making it the drug most used by American young people. In 2005, 17.1 percent of eighth-graders had consumed alcohol within the previous 30 days, compared with 9.3 percent who had smoked cigarettes and 6.6 percent who had used marijuana.<sup>xix</sup>
- In 2005, 17.1 percent of eighth-graders had consumed alcohol within the previous 30 days, compared with 9.3 percent who had smoked cigarettes and 6.6 percent who had used marijuana.<sup>xx</sup>

### **Early Initiation into Alcohol Use Puts Young People at Much Greater Risk of Negative Consequences Later in Life**

- Survey data indicate that those who start to drink before age 13 are nine times more likely to binge drink frequently (five or more drinks per occasion at least six times per month) compared with high school students who begin drinking later, according to an analysis published in 2005 by NIAAA.<sup>xxd</sup>
- Compared with non-drinkers, frequent binge drinkers (nearly 1 million high school students nationwide) were more likely to engage in other risky behaviors in the previous 30 days including carrying a gun, using marijuana, using cocaine, and having sex with six or more partners.<sup>xxi</sup>
- Compared with persons who wait until age 21 or older to start drinking, those who start to drink before age 15 are 12 times more likely to be unintentionally injured while under the influence of alcohol, seven times more likely to be in a motor vehicle crash after drinking, and at least 10 times more likely to be in a physical fight after drinking later in life.<sup>xxiii</sup>
- Those who start to drink before age 15 are also four times more likely to meet the criteria for alcohol dependence at some point in their lifetime.<sup>xxiv</sup>

### **Drinking and Driving Leads to Numerous Fatalities**

- According to data published by the U.S. National Highway Traffic Safety Administration (NHTSA), every day approximately three teens die from drinking and driving.<sup>xxv</sup>
- NHTSA reports that 3,523 young drivers aged 16 to 20 died in motor vehicle crashes in 2004. Of these, 1,048 (30 percent) had been drinking.<sup>xxvi</sup>
- Driving while intoxicated increase significantly between 1998 and 2001 among college students and others in the 18 to 24 age group, from 26.5 percent to 31.4 percent.<sup>xxvii</sup>

### **Drinking Results in Non-Driving-Related Fatalities**

- Every day, at least six teens die of non-driving alcohol related causes, such as homicide, suicide, and drowning.<sup>xxviii</sup>
- Alcohol has been reported to be involved in 36 percent of homicides, 12 percent of male suicides, and 8 percent of female suicides involving people under 21—a total of about 1,500 homicides and 300 suicides in 2000.<sup>xxix</sup>

### **Drinking is Strongly Linked to Violent Crime**

- Young people under the age of 21 commit 45 percent of rapes, 44 percent of robberies, and 37 percent of other assaults.<sup>xxx</sup>
- It is estimated that nearly half (47%) of assaults are alcohol-related.<sup>xxxi</sup>
- More than 70,000 college students are victims of alcohol-related sexual assault or date rape each year.<sup>xxxi</sup>
- An estimated 1,400 college students die each year from alcohol-related injuries and 500,000 students are injured while under the influence of alcohol each year.<sup>xxxiii</sup>

### **Drinking Increases Likelihood of Sexual Activity**

- Teenage girls who binge drink are up to 63 percent more likely to become teen mothers.<sup>xxxiv</sup>

- In 2001, 8 percent or an estimated 400,000 full-time college students, ages 18 to 24 in the United States had unprotected sexual intercourse as a result of drinking.<sup>xxxv</sup>
- Among Black and Hispanic youth, early alcohol initiation is positively associated with the number of sexual partners and pregnancy, as well as sexual initiation and recent intercourse. Black and Hispanic females who used alcohol by seventh grade were more likely than those who were non-drinkers to report recent sexual intercourse as tenth-grade students.<sup>xxxvi</sup>

#### **Drinking is Tied to Delinquent Behaviors**

- In 2003, the percentage of youth who engaged in delinquent behaviors (such as stealing, fighting, selling illegal drugs, or carrying a handgun) increased significantly with the level of past year alcohol use. Approximately 66 percent of youth who engaged in any of the delinquent behaviors listed above reported frequent binge drinking, compared with 57 percent of youth who reported binge alcohol use, 44 percent who reported past month alcohol use, 44 percent who reported alcohol use but not in the past month, and 30 percent who reported no alcohol use.<sup>xxxvii</sup>
- For example, the percentage of youth who carried handguns increased significantly as the level of youth drinking increased, according to an analysis published in 2005.<sup>xxxviii</sup>

## Attachment II – Model Language from Current Laws

### Model Language from Current Laws

In the March 2009 publication previously cited above entitled, “*Out-of-Home Alcohol Advertising: A 21<sup>st</sup>-Century Guide to Effective Regulation*,” the Marin Institute recommends that the most direct and powerful way that government can restrict advertising that appears on its property is to pass a law or an ordinance stating what content is prohibited. The Marin Institute gave the example that a locality could pass an ordinance prohibiting the placement of any alcohol-related advertising on public property.<sup>xxxix</sup> This study cited the following model language from current laws:

#### California (Cal Bus & Prof Code §25612.5)

Type of law: State level/content-neutral regulation

Relevant language: The Legislature finds and declares that it is in the interest of the public health, safety, and welfare to adopt operating standards as set forth in this section for specified retail premises licensed by the department. The standards set forth in this section are state standards that do not preclude the adoption and implementation of more stringent local regulations that are otherwise authorized by law. (*This is important to avoid preemption, which could preclude localities from going further than state law.*) No more than 33 percent of the square footage of the windows and clear doors of an off-sale premises shall bear advertising or signs of any sort, and all advertising and signage shall be placed and maintained in a manner that ensures that law enforcement personnel have a clear and unobstructed view of the interior of the premises, including the area in which the cash registers are maintained, from the exterior public sidewalk or entrance to the premises.

#### San Diego, California (§58.0501)

Type of law: City level/content-based regulation of alcohol ads aimed at reducing underage drinking

Relevant language: It is unlawful for any person, business, or retailer to place or maintain, or cause to be placed or maintained, any advertising of alcoholic beverages on a billboard that is within 500 feet of a school, playground, recreation center or facility, child care center, or library or that is more than 500 feet and the billboard face and its advertisement are clearly visible from a school, playground, recreation center or facility, child care center, or library. This section does not apply to any noncommercial message.

#### San Francisco, California

Type of law: Ban of alcohol advertisements on public transit

Note: this language can be quite simple. Most transit advertising policies already include a list of prohibited content, so just add alcohol to that list. You may also consider excluding other potentially harmful products, as this policy does.

Relevant language: Policy governing advertising on Municipal Transportation Agency (MTA) property. No advertisement posted on MTA property shall:

- Be false, misleading, or deceptive
- Appear to promote the use of firearms
- Be clearly defamatory
- Be obscene or pornographic
- Advocate imminent lawlessness or violent action
- Promote alcoholic beverages or tobacco products

San Jose, California (Ord. 27626)

Type of law: City level/content-based regulation of alcohol ads aimed at reducing drinking and driving

Relevant language: No beer and wine advertising shall be located on motor fuel islands and no self-illuminated advertising of beer or wine shall be located on buildings or windows.

Philadelphia, PA (Bill No. 030713)

Type of law: City level/content-based, government property/contracts

Relevant language: Every contract which permits any person to place advertising on City owned or controlled property shall include a provision prohibiting the placement on such property of advertisements for alcohol. For purposes of this section, City owned or controlled property does not include property used to hold professional sporting events.

Good example of legislative findings (i.e., the evidence needed) The City Council finds that:

(a) A September 10, 2003 report entitled, *Underage Drinking: A Collective Responsibility*, released by the National Academy of Sciences stated that more youth drink alcohol than smoke tobacco or use other illegal drugs;

(b) In the most recent national survey on drug use, the 2002 Monitoring the Future report, almost half or 48.6 percent of twelfth graders reported recent alcohol use;

(c) Underage drinking plays a substantial role in the three leading causes of death among youth—motor vehicle fatalities, suicide and homicide;

(d) According to the American Medical Association, underage drinking is a factor in nearly one-half of all teen automobile crashes, the leading cause of death among teenagers;

(e) Alcohol abuse among young people is also linked to two-thirds of all sexual assaults and date rape, and is a major factor in unprotected sex among youth, thereby increasing their risk of sexually transmitted diseases;

(f) The National Academy of Sciences estimates that the social cost of underage drinking is \$53 billion;

(g) In the Philadelphia Safe and Sound Report Card 2003, substance abuse among high school youth was rated "challenging, with major obstacles;"

(h) The most recent Youth Risk Behavior Survey compiled in 2001, which is based on self-reports by Philadelphia public high school students, found that 31.6 percent of high school youth report having had one drink in the most recent 30-day period;

(i) Research by the National Institute on Alcohol Abuse and Alcoholism, entitled *Effects of the Mass Media on the Use and Abuse of Alcohol* has found that exposure to alcohol advertisements affects young people's beliefs about drinking, intentions to drink, and actual drinking behavior;

(j) A substantial proportion of alcohol advertising reaches an underage audience and is presented in a style that is attractive to youth;

(k) A 1996 study of children ages 9 to 11 found that children were more familiar with Budweiser's television frogs than with Kellogg's Tony the Tiger or Smokey the Bear;

(l) In a survey conducted for the Center on Alcohol Marketing and Youth in June of 2003, two-thirds of parents say that seeing and hearing alcohol advertisements makes teens more likely to drink alcohol and 82 percent of the parents surveyed said that the risky behavior teens engage in while under the influence of alcohol is a problem in society today;

(m) Children and youth utilize city owned and controlled property on a daily basis, such as school buildings, recreation centers, libraries and bus shelters; and

(n) To the extent that commercial advertising is allowed in these public facilities, the City of Philadelphia can play a positive role in reducing exposure of youth to alcohol advertisements by prohibiting the placement of such advertisements

on publicly owned or controlled property.



### **Los Angeles County Current Law**

The Los Angeles, California County Code, Title 2 Administration, Part 2 Advertising, Chapter 2.132 Commercial Marketing-Promotion and Advertising, under 2.132.120 Authorization and 2.132.130 Limitations, C.,<sup>xl</sup> mandates the following:

- **2.132.120 Authorization** - Notwithstanding any other provision of the Los Angeles County Code, the Board of Supervisors is authorized to sell the right to advertise on property that is owned or operated by the County of Los Angeles (Ord. 91-0039 § 2 (part), 1991).
- **2.132.130 Limitations, C.** - No advertising for alcohol or tobacco products is permitted.

## References

- <sup>i</sup> U.S. Surgeon General. (2007) *Surgeon General's call to action to prevent and reduce underage drinking*. Washington, DC: Department of Health and Human Services, Office of the Surgeon General.
- <sup>ii</sup> Federal Trade Commission. *Self-regulation in the alcohol industry: Report of the Federal Trade Commission*. Washington, DC: Federal Trade Commission (2008).
- <sup>iii</sup> Center on Alcohol Marketing and Youth. *Youth exposure to alcohol advertising in national magazines, 2001-2008*. Baltimore, MD: Center on Alcohol Marketing and Youth (2010).
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- Smith, L.A., & Foxcroft, D.R. (2009) The effect of alcohol advertising, marketing and portrayal on drinking behaviour in young people: Systematic review of prospective cohort studies. *BMC Public Health*, 9(51), 1-11.
- <sup>iv</sup> R. Treffers, M. Simon, K. Parkins, and B. Livingston, "Out-of-Home Alcohol Advertising: A 21st-Century Guide to Effective Regulation," *Marin Institute* (March 2009):1-12.
- <sup>v</sup> Richard J. Bonnie and Mary Ellen O'Connell, Editors, Committee on Developing a Strategy to Reduce and Prevent Underage Drinking, Board on Children, Youth, and Families, National Research Council, National Research Council and Institute of Medicine of the National Academies, "Reducing Underage Drinking: A Collective Responsibility," (September 2003):1-760.
- <sup>vi</sup> G. Hastings, S. Anderson, E. Cooke, and R. Gordon, "Alcohol advertising and marketing and young people's drinking: a review of the research," *Journal of Public Health Policy* 26 (2005):296-311.
- <sup>vii</sup> L.B. Snyder, F.F. Milici, M. Slater, H. Sun, and Y. Strizhakova, "Effects of alcohol advertising exposure on drinking among youth," *Archives of Pediatrics and Adolescent Medicine* 160 (2006):18-24.
- <sup>viii</sup> G. Hastings, S. Anderson, E. Cooke, and R. Gordon, "Alcohol advertising and marketing and young people's drinking: a review of the research," *Journal of Public Health Policy* 26 (2005):296-311.
- <sup>ix</sup> A.W. Stacy, J.B. Zogg, J.B. Unger, C.W. Dent, "Exposure to televised alcohol ads and subsequent adolescent alcohol use," *American Journal of Health Behavior* 28 (2004):498-509.
- <sup>x</sup> P.L. Ellickson, R.L. Collins, K. Hambarsoomians, and D.F. McCaffrey, "Does alcohol advertising promote adolescent drinking? Results from a longitudinal assessment," *Addiction* 100 (2005): 235-246.
- <sup>xi</sup> G. Hastings, S. Anderson, E. Cooke, and R. Gordon, "Alcohol advertising and marketing and young people's drinking: a review of the research," *Journal of Public Health Policy* 26 (2005):296-311.
- <sup>xii</sup> M.J. Chen, J.W. Grube, M. Bersamin, E. Walters, D.B. Keefe, "Alcohol advertising: What makes it attractive to youth?," *Journal of Health Communication* 10 (2005): 553-565.
- <sup>xiii</sup> L.D. Johnston, P.M. O'Malley, J.G. Bachman, and J.E. Schulenberg, *Teen drug use down but progress halts among youngest teens* (Ann Arbor, MI: University of Michigan News and Information Services, December 19, 2005), table 3. Available at [http://monitoringthefuture.org/pressreleases/05drugpr\\_complete.pdf](http://monitoringthefuture.org/pressreleases/05drugpr_complete.pdf) (accessed March 14, 2006).
- <sup>xiv</sup> Calculated using the 2004 National Survey on Drug Use and Health. J. Gfroerer of the Substance Abuse and Mental Health Services Administration, e-mail to David H. Jernigan, PhD, February 3, 2006.
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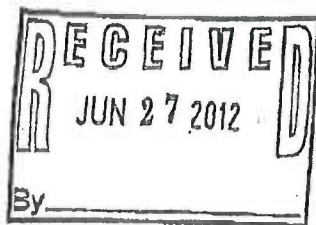
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Richard Alarcón  
Councilmember  
Seventh District  
City of Los Angeles

June 25, 2012

Dear Mr. Alarcón,

Thank you for your letter on May 30, 2012. In that letter you asked for my specific input "in analyzing the potential benefit the legislation may have on reducing underage drinking, provide any studies or surveys on alcohol advertising that influences underage alcohol drinking, share reports and data on the financial burden and loss of productivity and life caused by underage drinking".

***Alcohol advertising that influences underage alcohol drinking***

A large number of studies have considered the impact of alcohol advertising on underage drinking. Out of these studies, information has been collected from seven rigorously selected cohort studies featuring information on 13,255 participants<sup>1</sup>. This study evaluated a range of different alcohol advertisement and marketing exposure including print and broadcast media. Two studies measured the hours of TV and music video viewing. All measured drinking behavior using a variety of outcome measures. Two studies evaluated drinkers and non-drinkers separately. Baseline non-drinkers were significantly more likely to have become a drinker at follow-up with greater exposure to alcohol advertisements. In studies that included drinkers and non-drinkers, increased exposure at baseline led to significantly increased risk of drinking at follow-up.

This large systematic review concludes that exposure to ads and product placement, even those supposedly not directed at young people, leads to increased alcohol consumption. It is recommended that counter advertising, social marketing techniques and other prevention options such as parenting programs, price increases and limiting availability appears to be useful to limit alcohol problems in young people.

***Financial burden and loss of productivity and life caused by underage drinking***

Underage drinking costs the citizens of California \$6.8 billion in 2010. These costs include medical care, work loss, and pain and suffering associated with multiple problems resulting from the use of alcohol by youth<sup>2</sup>. This translates to a cost of \$1,811 per year for each youth in the state or \$3.05 per drink consumed underage. Excluding pain and suffering from

these costs, the direct costs of underage drinking incurred through medical care and loss of work cost California \$2,918 million each year or \$1.31 per drink. In contrast, a drink in California retails for \$1.51.

#### Costs of Underage Drinking by Problem, California 2010 \$

Problem	Total Costs (in millions)
Youth Violence	\$3,754.5
Youth Traffic Crashes	\$1,136.0
High-Risk Sex, Ages 14-20	\$553.1
Youth Property Crime	\$606.8
Youth Injury	\$188.2
Poisonings and Psychoses	\$83.9
FAS Among Mothers 15-20	\$151.5
Youth Alcohol Treatment	\$305.3
<b>Total</b>	<b>\$6,779.4</b>

Youth violence (homicide, suicide, aggravated assault) and traffic crashes attributable to alcohol use by underage youth in California represent the largest costs for the state. However, a host of other problems contribute substantially to the overall cost. Among teen mothers, fetal alcohol syndrome (FAS) alone costs California \$152 million.

Young people who begin drinking before age 15 are four times more likely to develop alcohol dependence and are two and a half times more likely to become abusers of alcohol than those who begin drinking at age 21<sup>3</sup>. In 2009, 7,240 youth 12-20 years old were admitted for alcohol treatment in California, accounting for 17% of all treatment for alcohol abuse in the state<sup>4</sup>.

#### *Alcohol Consumption by Youth in California*

Underage drinking is widespread in California. Approximately 1,372,000 underage customers in California drink each year. In 2007-2009, California students in grades 9-12 reported:<sup>5</sup>

- 56.6% had at least one drink of alcohol on one or more days during their life.
- 19.9% had their first drink of alcohol, other than a few sips before age 13.
- 34.0% had at least one drink of alcohol on one or more occasion in the past 30 days.
- 21.0% had five or more drinks of alcohol in a row (binge drinking) in the past 30 days.
- 7.5% had at least one drink of alcohol on school property in the past 30 days.

In 2009, underage customers consumed 17.5% of all alcohol sold in California, totaling \$3,352 million in sales (in 2010 dollars). These sales provided profits of \$1,641 million to the alcohol industry<sup>2</sup>. Ranking states based on the percentage of alcohol consumed underage, with 1 the highest, California ranked number 33. This percentage is affected by both adult and youth drinking levels.

Annual sales of alcohol consumed by youth in California averaged \$2,443 per underage customer. Underage customers were heavier consumers than adults. They drank an average of 4.4 drinks per day; in contrast, legal customers consumed only 1.6.

### *Harm Associated with Underage Drinking in California*

Underage drinking in California leads to substantial harm due to traffic crashes, violent crime, property crime, unintentional injury, and risky sex.

- During 2009, an estimated 141 traffic fatalities and 7,552 nonfatal traffic injuries were attributable to driving after underage drinking.
- In 2009, an estimated 239 homicides; 114,500 nonfatal violent crimes such as rape, robbery, and assault; and 179,000 property crimes including burglary, larceny, and car theft were attributable to underage drinking.
- In 2007, an estimated 28 alcohol involved fatal burns, drownings, and suicides were attributable to underage drinking.
- In 2009, an estimated 2,820 teen pregnancies and 115,282 teens having risky sex were attributable to underage drinking.

In closing, Assemblyman Alarcón, I strongly support your legislation to prohibit alcohol advertising on city owned and controlled property modeled after similar ordinances in the cities of San Francisco, CA and Philadelphia, PA.

Yours Sincerely,



Ernest P. Noble, Ph.D., M.D.

Director of the UCLA Alcohol Research Center

Former Director of National Institute on Alcohol Abuse and Alcoholism (NIAAA) in Washington D.C.

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August 13, 2012

Councilman Richard Alarcón  
City of Los Angeles  
200 N. Spring St. Room 270  
Los Angeles, CA 90012

Dear Councilman Alarcon:

In response to your letter requesting the RAND Corporation's analysis regarding the relationship between outdoor advertising and youth consumption of alcohol, I'd like to review our research on this field.

Outdoor advertising provides constant visual reminders of products and services to citizens who must see them every day. In many ways, outdoor advertising speaks to a "captive audience." Unlike ads in magazines, on television, and those coming across our computer screens, ads on billboards, in bus shelters, and in other outdoor venues cannot be closed, turned off, or sometimes, simply ignored. Needless to say, outdoor advertising does not come with parental control buttons.

Understanding how the advertisement of alcohol in outdoor mediums impacts underage drinking in Los Angeles is ultimately important to the health, safety, and wellbeing of youth, their families, and our larger community. The economic costs associated with excessive drinking in the U.S. are approximately one-quarter of a trillion dollars each year, with more than 10% of those costs attributable to those under the legal drinking age (Bouchery et al., 2011). Moreover, the economic cost of alcohol problems in California exceeded \$38 billion in 2005 (Rosen et al.).

While only one or two studies have investigated the connection between youth and outdoor advertising specifically, more than a dozen studies suggest strongly that exposure to alcohol advertising in general influences adolescent drinking. A few key findings are listed below:

Alcohol advertising clearly affects adolescent drinking. In 2005, RAND researchers analyzed data from thousands of mid-western students participating in a large-scale field trial of "Project ALERT," a RAND-designed drug prevention program (Collins et al. 2005; Ellickson et al. 2005). Adolescent health experts tracked exposure to beer ads and subsequent drinking among more than 3,000 students as they moved from middle school to high school.

The researchers found that nearly half of the 7th grade nondrinkers became drinkers by 9th grade and the more ads youth saw during 8th grade, the greater the likelihood they fell into one of

these two groups of 9th grade drinkers. These patterns persisted after the researchers accounted for numerous other influences on youth drinking, including doing poorly in school and having peers who drink.

In 2006, another group of researchers found that for each alcohol advertisement a young person saw, he or she drank *one percent more* alcohol than they did before viewing the advertisement (Snyder et al. 2006). The monthly average of alcohol advertisements viewed at the time of the study was 23. This study also found that young people drank three percent more for each additional dollar per capita spent on alcohol advertising in a local market.

Outdoor alcohol advertising invites young people to drink. Brand recognition starts early; RAND researchers found that children recognize specific beer ads on TV at an early age, at least as young as age 9 (Collins et al. 2005; Ellickson et al. 2005). Earlier studies from the 1990s suggest that adolescents who are led to think that alcohol has few negative consequences and more favorable ones are more likely to use alcohol (Earleywine 1995; Grube et al. 1995).

A later study from 2007 supports this finding in relation to outdoor advertising (Pasch et al, 2007). Researchers examined the association between exposure to alcohol advertising in sixth grade and alcohol intentions, attitudes, and use in eighth grade. They found that the 931 alcohol advertisements placed within 1,500 feet of the 63 Chicago school sites did raise the intentions to use among even sixth-grade nonusers. This suggested to the researchers that even "those who have not used alcohol are still influenced by alcohol advertising." This finding held even after controlling for school socioeconomic status, sixth grade levels of alcohol expectancies and intentions, and exposure to other forms of alcohol advertising.

Outdoor alcohol advertising reaches all young people, especially those in vulnerable communities. A recent study of alcohol advertising in Boston subway stations found that alcohol advertising exposed every Boston public school student in grades 5 to 12 to an average of 1.34 alcohol ads per day (Gentry et al., 2011). Moreover, this study found that transit advertising was more prevalent in Boston neighborhoods with low rates of poverty. This suggests that alcohol advertising targets low-income communities.

Other studies have also identified systematic targeting of vulnerable communities by outdoor alcohol advertising (Hackbarth, et al., 1995; Harwood et al., 2003; Schooler et al., 1996). One RAND study examined differences of response to alcohol advertising on television among different demographic groups (Ringel et al., 2006). They suggest that the amount of exposure to alcohol advertising a particular group receives can ultimately effect their consumption. For example, the researchers found that African-American youth, particularly males, are exposed to more alcohol advertising than white youth, and that alcohol-related problems and diseases such as alcohol abuse and liver cirrhosis are particularly severe in the African-American community.

Community action works. In one study of advertising restriction policies in 20 countries over 25 years, researchers found that both partial and complete bans on alcohol advertising reduced consumption (Saffer & Dave, 2002). This study estimated that each additional ban on alcohol advertising would reduce consumption by about five to eight percent. Moreover, education about alcohol both in school drug prevention programs like Project ALERT (for middle schools) and



ALERT Plus (for middle schools and high schools) can help. However, as one RAND team has argued, positive and immediate social models, such as peers and close, influential adults, are perhaps the greatest source of alcohol use prevention (Martino et al., 2006).

RAND Health research has suggested that alcohol advertising policies should take into consideration all ad venues to which adolescents are exposed, including magazines, TV, in-store displays, and concession stands at sports events and concerts. Additionally, school drug prevention programs can dampen the appeal of alcohol advertisements. Helping children become aware of and able to conquer the multiple sources of alcohol advertising to which they are exposed should be an important component of school prevention programs, as well as parental oversight and input.

Sincerely,



Monica Banken  
Office of External Affairs

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JOHNS HOPKINS  
U N I V E R S I T Y

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Date: July 31, 2012

Re: Council File: 11-1429

Testimony of David H. Jernigan, PhD to the Los Angeles City Council

My name is David Jernigan, and I am the Director of the Center on Alcohol Marketing and Youth at the Johns Hopkins Bloomberg School of Public Health. My comments in this testimony are my own views and do not represent the official position of the Bloomberg School or Johns Hopkins University.

Alcohol use is widespread among our youth, and the consequences of youth alcohol use are real and tragic. In 2010, 41.2% of U.S. high school seniors reported drinking in the past month, and 21.6% reported binge drinking in the past two weeks.(1) In Los Angeles, 25.5 percent of high school students reported drinking alcohol for the first time before 13 years of age, 33 percent drank alcohol in the past month, and 18 percent reported binge<sup>1</sup> drinking.(2) Alcohol is the most popular drug of intoxication among our youth. Every day in this country, 4,500 children under the age of 16 begin drinking.(3) The average age of first drink for 12- to 17- year-olds is 14, and this has changed little in recent years.(4) People aged 12 to 20 drink between 11 and 20% of all alcohol consumed in the US, and they drink to get drunk: more than 90% of the alcohol they consume is drunk when they are having five or more drinks within two hours.(5, 6)

Underage drinking is of great concern because the younger people are when they start drinking, the worse the consequences are likely to be. According to the U.S. Surgeon General, young people who begin drinking prior to the age of 15 are five times more likely to develop alcohol problems later in life than those who wait until they are 21 to drink.(7) They are four times more likely to develop alcohol dependence,(8) six times more likely to be in a physical fight after drinking, more than six times more likely to be

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<sup>1</sup> This survey defines binge drinking as, "had five or more drinks of alcohol in a row within a couple of hours on at least 1 day during the 30 days before the survey."

in a motor vehicle crash because of drinking, and almost five times as many from other unintentional injuries after drinking.(9) Every year, about 100 people under age 21 die from injuries resulting from excess alcohol use. In California, approximately 541 deaths of young persons under age 21 are attributed to alcohol use.(10)

In 2003, Congress requested the National Research Council on Alcoholism and Other Drug Problems in Medicine to recommend a strategy to reduce and prevent underage drinking. After a review of the evidence, they concluded that we need a “broader strategy for reducing underage drinking, including reducing youth exposure to alcohol advertising.(11)

Alcohol is indeed too attractive and too easy to obtain for our youth. The Center on Alcohol Marketing and Youth have found that the exposure to alcohol advertising between the ages of 12 and 20 in 2009 (the last year for which data is available) was approximately 366 alcohol ads on television alone – an average of 1.5 ads per hour. Youth-oriented magazines are filled with alcohol advertising, and two-thirds of all alcohol ads on radio are played at times when youth are listening per capita than adults.(14) Exposure to all this advertising has led to more people: more than 14 long-term studies have followed groups of youth who were measured their exposure to alcohol marketing and their drinking. The studies found that the more youth are exposed to alcohol marketing, the more they drink, or, if already drinking, to drink more.(15, 16) One study found that for every advertisement a young person saw above the monthly average, they drank 10 percent more. This same study demonstrated that for every dollar spent on alcohol advertising in a local market, young people drank 10 percent more.(17)

In the midst of high levels of youth exposure to alcohol advertising, what can cities do? Baltimore led the nation more than a decade ago in reducing youth exposure to alcohol and tobacco advertising in public places by banning alcohol and tobacco advertising in public places. Based on the knowledge that the city supports public transit for schoolchildren to take public transit to school every year, in 2001, the City Council unanimously passed an ordinance banning future alcohol and tobacco advertising on city-owned property.(18) A study published in 2009 found that in Baltimore, youth viewed an estimated 18,269 times by public school students on city-owned property an average weekday, reaching the equivalent of 54.1% of that percentage in 2012, the Massachusetts Bay Transportation Authority in Boston banned alcohol and tobacco advertising on its property including subway cars, trains, bus

The minimum legal purchase age laws for alcohol in the United States are one of the most thoroughly evaluated and effective steps we have taken to reduce youth alcohol consumption and related consequences.(20) These laws help to explain why our teens are substantially less likely to drink than teens in comparable countries in Europe.(21) File #11-1429 will help the City of Los Angeles play a positive role in reducing youth exposure to alcohol advertisements to the extent that commercial advertising is allowed on or in publically owned or controlled facilities. It will help us to limit young peoples' exposure to alcohol advertising, reduce alcohol consumption among our youth, and make our neighborhoods safer places for young people to grow up and flourish.

Thank you very much.

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February 7, 2014

The Honorable Mitchell Englander  
Councilmember, City of Los Angeles  
200 N. Spring Street  
Los Angeles, CA 90012

**Re: Support Prohibiting Alcohol Advertising on Los Angeles City Public Property  
(Council file-11-1429)**

Dear Councilmember Mitchell Englander,

On behalf of the Los Angeles County Department of Public Health Substance Abuse Prevention and Control program (DPH-SAPC), I am writing to express support for the proposed legislation prohibiting alcohol ads on city owned and controlled property – Los Angeles City Council File: 11-1429. The proposed ordinance is in alignment with DPH's mission to protect health, prevent disease, and promote health and well-being; in addition to efforts aimed at mitigating the health and economic cost of alcohol use and the influence of alcohol advertising among our youth.

Reducing the impact of alcohol marketing on young people is an important public health goal since underage drinking is a significant contributor to youth alcohol-related motor vehicle crashes and other forms of injury, violence, suicide, and problems associated with school and family, detailed in Attachment I to this document. Furthermore, the Los Angeles City proposal is consistent with the County of Los Angeles Code banning alcohol advertising on County owned or operated properties, detailed in Attachment II to this document.

DPH-SAPC supports the City of Los Angeles' proposed legislation prohibiting alcohol ads on city owned and controlled property and welcomes the opportunity to assist the City of Los Angeles in its efforts to protect the health of its residents.

The Honorable Mitchell Englander  
February 7, 2014  
Page 2

For additional information regarding DPH-SAPC prevention or policy efforts regarding alcohol advertising, please contact Michelle Gibson, SAPC Prevention, Youth Treatment Programs and Policy director at (323) 869-8516.

Sincerely,

A handwritten signature in cursive script that reads "Wesley Ford". The signature is written in dark ink and is positioned above the printed name.

Wesley L. Ford, M.A., M.P.H., Director  
Substance Abuse Prevention and Control

WLF:lb

Attachments



## Attachment I: Research Studies Regarding Alcohol Advertising and Underage Drinking

### Alcohol Industry Advertising

In a May 2012 publication entitled, "*State Laws to Reduce the Impact of Alcohol Marketing on Youth: Current Status and Model Policies*," the Center on Alcohol Marketing and Youth, at the John Hopkins University Bloomberg School of Public Health reported the following advertising efforts made by the alcohol industry:

- The alcohol industry spent more than \$4 billion each year marketing its projects.<sup>2</sup>
- Underage youth receive substantial exposure to this marketing, and multiple longitudinal studies have correlated this exposure with greater likelihood of drinking, or if young people have already initiated alcohol use, drinking more.<sup>3</sup>

The Marin Institute in its March 2009 publication entitled, "*Out-of-Home Alcohol Advertising: A 21<sup>st</sup>-Century Guide to Effective Regulation*,"<sup>4</sup> cited the following:

- Spending on out-of-home advertising grew to over \$8 billion dollars in 2008.
- The term out-of-home advertising has replaced "outdoor advertising" because advertisers are no longer just using billboards and signs to reach consumers; some of the newer techniques, such as video display terminals, are placed indoors.
- High-tech out-of-home advertisements such as digital billboards, video networks, and digital ads on buses were expected to grow to over \$2.65 billion in 2009.
- Historically, the alcohol industry has been one of the largest purchasers of outdoor advertising.
- Since 2006, the alcohol industry increased total advertising spending 4.8 percent to total 2.2 billion.

### Prevalence and Toll of Underage Drinking in America

In a September 2003 report brief entitled, "*Reducing Underage Drinking: A Collective Responsibility*," the National Research Council and Institute of Medicine of the National Academies reported that the prevalence and toll of underage drinking in America is widely underestimated: its costs the nation a conservatively estimated \$53 billion annually.<sup>5</sup>

### Link Between Ads and Minor Consumption

In another March 2006 publication entitled, "*Underage Drinking in the United States: A Status Report 2005*," the Center on Alcohol Marketing and Youth cited that youth exposure to alcohol advertising is substantial as demonstrated through the following studies:

- Long-term studies have shown that youth who see, hear, and read more alcohol ads are more likely to drink and drink more heavily than their peers.<sup>6</sup>
- The first national long-term study of youth throughout the United States, funded by the National Institute on Alcohol Abuse and Alcoholism, found that for underage youth, exposure to an additional alcohol ad was correlated with a 1 percent increase in drinking, and that youth drank 3 percent more for every additional dollar per capita spent on alcohol advertising in a local market.<sup>7</sup>
- This study comes on the heels of two other long-term federally-funded studies as well as a variety of studies from other countries that, taken together, present an increasing compelling picture that alcohol marketing has an effect on young people's drinking.<sup>8</sup>
- A study of 2,250 middle-school students in Los Angeles found that a one standard deviation increase in exposure to television programs containing alcohol commercials in seventh grade was related to a 1.4-fold increase in the likelihood of beer consumption, a 1.3-fold increase in wine/spirits consumption, and a 1.3-fold increase in consuming at least three drinks in a row one year later.<sup>9</sup>
- Another study, of middle-school students in South Dakota, found that exposure in seventh grade to beer advertising via magazines, concession stands at sporting and music events, and in-store displays, but not television, predicted frequency of drinking in ninth grade.<sup>10</sup>
- Numerous long-term studies in other countries have found as well that youth who see, hear, and read more alcohol ads are more likely to drink and drink more heavily than their peers.<sup>11</sup>
- A study of 253 10 to 17 year olds in California found that specific elements of beer ads (such as humor or use of animal characters) significantly contributed to how much the young people liked the ads, which in turn increased these young people's intentions to purchase the product and beer brand promoted by these advertisements. In contrast, ads that focused on product-related characteristics or sent a message about the minimum drinking age reduced young people's desire to purchase the product associated with them.<sup>12</sup>

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## **Attachment II: Los Angeles County Current Law**

The Los Angeles, California County Code, Title 2 Administration, Part 2 Advertising, Chapter 2.132 Commercial Marketing-Promotion and Advertising, under 2.132.120 Authorization and 2.132.130 Limitations, C.,<sup>1</sup> mandates the following:

- **2.132.120 Authorization** - Notwithstanding any other provision of the Los Angeles County Code, the Board of Supervisors is authorized to sell the right to advertise on property that is owned or operated by the County of Los Angeles...(Ord. 91-0039 § 2 (part), 1991.)
- **2.132.130 Limitations, C.** - No advertising for alcohol or tobacco products is permitted.



School of Community and Global Health

May 22, 2013

The Honorable Richard Alarcón  
Councilmember, Seventh District  
City of Los Angeles  
200 North Spring Street, Room 470  
Los Angeles, California 90012

Dear Council member Alarcón:

Thank you for the opportunity to provide you with information on the influence of alcohol advertisements on underage drinking. This letter supplements the letters that you have already received from Dr. Nobel at UCLA and Dr. Fielding from the LA County Department of Public Health. I agree with the summary of studies they have provided that show the negative impact alcohol advertising can have on youth consumption of alcohol and the increased risk to the health of those youth due to that consumption.

My colleagues, Dr. Alan W. Stacy and Dr. Clyde Dent, and I recently published in *Pediatrics* (1/28/2013), a well-respected medical journal, our report on a large study of alcohol advertising, alcohol use, and alcohol-related problems among adolescents in the greater Los Angeles area. We recruited nearly 3,000 students in 7<sup>th</sup> grade from randomly selected middle schools and surveyed them once a year across a 4 year period. The results showed that the level of exposure to televised alcohol advertisements in the 7<sup>th</sup> grade predicted the increase in alcohol use in 7<sup>th</sup>, 8<sup>th</sup>, and 9<sup>th</sup> grades, which in turn predicted the number of problems related to alcohol use in 10<sup>th</sup> grade. Problems ranged from failing to do homework to getting into fights because of drinking alcohol. Our study replicates previous findings on the influence of alcohol advertising on underage drinking, and importantly, this was the first study to demonstrate the link from exposure to alcohol advertising to problems related to underage drinking.

I strongly support your effort to protect the health of our youth by limiting their exposure to alcohol advertising through passage of the ordinance to ban alcohol advertisements from city owned and controlled property.

Sincerely,

A handwritten signature in cursive script that reads "Jerry Grenard".

Jerry L. Grenard, Ph.D.  
Assistant Professor  
School of Community and Global Health  
Claremont Graduate University

Attachment: *Pediatrics* Article from 1/28/2013

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## Exposure to Alcohol Advertisements and Teenage Alcohol-Related Problems

Jerry L. Grenard, Clyde W. Dent and Alan W. Stacy

*Pediatrics*; originally published online January 28, 2013;

DOI: 10.1542/peds.2012-1480

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/early/2013/01/23/peds.2012-1480>

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# Exposure to Alcohol Advertisements and Teenage Alcohol-Related Problems

**AUTHORS:** Jerry L. Grenard, PhD,<sup>a</sup> Clyde W. Dent, PhD,<sup>b</sup> and Alan W. Stacy, PhD<sup>a</sup>

<sup>a</sup>*School of Community and Global Health, Claremont Graduate University, Claremont, California; and* <sup>b</sup>*Office of Disease Prevention and Epidemiology, Oregon Department of Human Services, Portland, Oregon*

## KEY WORDS

alcohol advertising, alcohol drinking, adolescent, statistical model

## ABBREVIATIONS

CI—confidence interval  
OR—odds ratio

Dr Grenard contributed to the conception of the statistical model, analyzed the data, and prepared the manuscript; Dr Dent contributed to the acquisition of data and analysis of the data, revised the methods and analysis sections of the document, and provided final approval of the manuscript; and Dr Stacy contributed to the conception and design of the study, revised the introduction and discussion sections for intellectual content, and approved the final version of the manuscript.

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**WHAT'S KNOWN ON THIS SUBJECT:** The influence of alcohol advertising on underage drinking has been demonstrated in both cross-sectional and prospective studies. What is not well known is whether this increase in drinking leads to more problems related to alcohol consumption.

**WHAT THIS STUDY ADDS:** Exposure to alcohol advertising and liking of those ads in grade 7 has a significant influence on the severity of alcohol-related problems in grade 10 and that influence is mediated by growth in alcohol use from grades 7 to 9.

abstract



**OBJECTIVE:** This study used prospective data to test the hypothesis that exposure to alcohol advertising contributes to an increase in underage drinking and that an increase in underage drinking then leads to problems associated with drinking alcohol.

**METHODS:** A total of 3890 students were surveyed once per year across 4 years from the 7th through the 10th grades. Assessments included several measures of exposure to alcohol advertising, alcohol use, problems related to alcohol use, and a range of covariates, such as age, drinking by peers, drinking by close adults, playing sports, general TV watching, acculturation, parents' jobs, and parents' education.

**RESULTS:** Structural equation modeling of alcohol consumption showed that exposure to alcohol ads and/or liking of those ads in seventh grade were predictive of the latent growth factors for alcohol use (past 30 days and past 6 months) after controlling for covariates. In addition, there was a significant total effect for boys and a significant mediated effect for girls of exposure to alcohol ads and liking of those ads in 7th grade through latent growth factors for alcohol use on alcohol-related problems in 10th grade.

**CONCLUSIONS:** Younger adolescents appear to be susceptible to the persuasive messages contained in alcohol commercials broadcast on TV, which sometimes results in a positive affective reaction to the ads. Alcohol ad exposure and the affective reaction to those ads influence some youth to drink more and experience drinking-related problems later in adolescence. *Pediatrics* 2013;131:e369–e379

Alcohol use among adolescents and young adults is a major health concern in the United States. According to a Substance Abuse and Mental Health Services Administration report published in 2004,<sup>1</sup> ~10.9 million (29%) adolescents reported drinking alcohol in the past month, 16.6% reported problem behaviors related to alcohol use, and 6.2% met *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria for substance abuse or dependence.<sup>2</sup> Because of the risks involved, considerable attention has been given to the influence of alcohol advertising on underage drinking. Cross-sectional studies have consistently shown a small but significant association between exposure to alcohol ads and alcohol use.<sup>3-6</sup> More importantly, prospective studies have shown similar findings providing support for a temporal relationship between exposure to ads and alcohol use,<sup>7-13</sup> which has been confirmed in a systematic review of 13 longitudinal studies.<sup>14</sup> Few studies, however, have successfully used prospective data to demonstrate the temporal relationship among exposure to alcohol ads, alcohol consumption, and problem behaviors associated with alcohol use.

The current study examined the effects of alcohol ad exposure on consumption and problem behaviors across 4 years of data collection to test 2 hypotheses. First, the influence of exposure to alcohol ads on underage drinking was hypothesized to interact with an effect modifier (or moderator): an affective reaction to alcohol ads, self-reported as a liking of alcohol ads.<sup>5,15</sup> It was anticipated that adolescents who like alcohol advertisements will be more likely to elaborate on the content of the ads (eg, imagine themselves in the scene), and as a result, they will be more likely to be persuaded to try the product.<sup>16,17</sup> Studies on copy testing by advertisers have shown that liking of advertisements

is predictive of sales for consumer products.<sup>18</sup> In addition, drinking among adolescents and young adults is associated with desirability and identification with characters in alcohol ads<sup>5</sup> and with liking of alcohol ads.<sup>10,19</sup> Second, it was hypothesized that the growth in alcohol use over the first 3 years of the study would significantly mediate the relationship between exposure to alcohol ads in year 1 and alcohol-related problems in year 4 (see paths a and b in Fig 1). That is, effects of Year 1 alcohol ads on the growth in alcohol consumption over time (path a) was expected to translate into later (Year 4) levels of alcohol problems (path b). Figure 1 depicts a conceptual model that incorporates both key hypotheses within a moderated-mediation model.

## METHODS

### Participants

The current data were collected as part of a prospective study on the influence of alcohol advertising on underage drinking.<sup>12,13</sup> Participants recruited from public schools were surveyed during regular school hours from the 7th through 10th grades. Of the 4186 students recruited to participate in the study, 3890 (93% of consented) students completed the survey in at least 1 wave: 2986 (77%) were surveyed in 7th grade, 2849 (73%) in the 8th grade, 2093 (54%) in the 9th grade, and 1609

(41%) in the 10th grade. Dropout in the 9th and 10th grades was largely because of failure of entire schools to remain in the study after initial agreements by the schools to participate. Thus, most dropouts were not because of subject self-selection factors that could confound results. Further, the data analysis (outlined below) thoroughly addresses missing data. A total of 23 public middle schools, randomly selected from all middle schools in Los Angeles County, agreed to participate in the study. The goal was to recruit a sample representative of students attending Los Angeles County high schools.

### Procedures

All seventh grade students in each school at the time of the study were invited to participate. Data collectors visited classrooms to distribute consent and assent forms to students about 2 weeks before administering the surveys. Parents of the students either signed a consent form brought home from school by the student or gave verbal consent to data collectors via telephone if the consent forms were not returned. Students signed assent forms before completing the surveys. The surveys and all procedures were approved by the University of Southern California Institutional Review Board. Students completed paper-and-pencil questionnaires during regular classroom hours at their school.

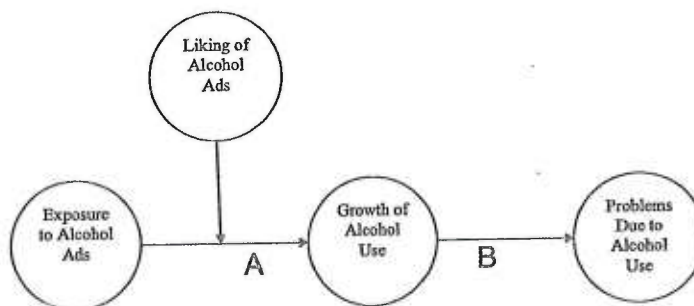


FIGURE 1  
Conceptual model of primary hypothesized paths tested in the moderated-mediation models.

## Outcome Measures

Current alcohol use was assessed with a total of 9 self-report items. Five items<sup>20</sup> assessed on how many days during the past 30 days the participant drank beer, wine, or liquor; drank 3 or more beers in a row; drank 3 or more glasses of wine or liquor; and drank enough to get drunk. An additional 4 items asked how often in the past 6 months participants drank beer, drank wine or wine coolers, drank liquor, or got drunk. An index was formed from all 9 items (coefficient  $\alpha = 0.91$ ). Problems due to alcohol use were assessed with 8 self-report items.<sup>21</sup> Participants indicated how often their alcohol use caused them problems, such as not being able to do their homework, getting into fights, neglecting responsibilities, or causing someone shame or embarrassment. An index score was formed from the 8 items (coefficient  $\alpha = 0.93$ ).

## Independent Variables

Four measures of exposure to alcohol advertising were assessed: (1) Exposure to alcohol advertising on popular shows. Participants indicated how frequently they watched 20 popular TV shows during the past month on a 6-point scale ranging from 1 (never) to 6 (every day). The frequency of watching each show was multiplied by the average frequency of alcohol advertising broadcast on each show during the 10 months before the survey.<sup>22</sup> Data on televised alcohol advertising during the popular shows was purchased from Nielsen Media Research (New York, NY). The weighted items were summed to yield an index score for the number of alcohol ads each participant was exposed to during a typical day of watching popular shows (coefficient  $\alpha = 0.79$ ). This measure of exposure does not directly ask about exposure to alcohol ads, and it has been predictive of alcohol use in past studies.<sup>13,22</sup> (2)

Exposure to alcohol advertising on sports programs. This measure was similar to the popular shows assessment except that it asked about the frequency of watching college and professional sports programs (coefficient  $\alpha = 0.80$ ), which often include a higher frequency of alcohol advertisements than other programming.<sup>23</sup> (3) Memory for alcohol ads: cued recall. Surveys included still pictures captured from TV advertisements including 2 example and 15 test ads.<sup>24</sup> The still pictures extracted from advertisements did not contain brand names or logos. An open-ended item asked participants to write down what product was being advertised. Independent judges coded the responses as being related to the advertisement or not ( $\kappa = 0.88$ ). (4) Self-reported observation of alcohol advertising. Participants were asked 4 items<sup>25</sup> about how often they saw alcohol commercials on TV (coefficient  $\alpha = 0.72$ ).

The survey included 3 items assessing how much participants like alcohol ads on TV.<sup>26</sup> The items assessed whether participants thought that alcohol ads are funny or sexy, and whether they like the alcohol ads better than other ads (coefficient  $\alpha = 0.78$ ). These items measured an affective or emotional reaction to alcohol ads that has been useful in both the study of alcohol advertising<sup>5,15,19</sup> and by the advertising industry in general to estimate the potential effectiveness of advertising copy.<sup>18</sup> Additional covariates associated with advertising exposure, alcohol use, or alcohol-related problems included the amount of time watching television<sup>27,28</sup>; observing friends drinking<sup>29</sup>; observing well-known adults drinking<sup>30</sup>; participating in sports<sup>31</sup>; age, gender, ethnicity, language acculturation<sup>32,33</sup>; and parents' occupation and education (see Appendix for assessments).

## Data Analyses

Construction of the structural equation models used to test the hypotheses

involved 2 steps.<sup>34</sup> First, a measurement model established the simple structure of the model, measurement invariance across gender,<sup>35</sup> and acceptability of parcels as indicators.<sup>36</sup> The second step involved fitting of 4 latent growth-curve models, one for each measure of exposure to alcohol advertising. Goodness-of-fit statistics<sup>37</sup> included the  $\chi^2$  test, Comparative Fit Index, Tucker-Lewis Index, Root Mean Squared Error of Approximation, and the Standardized Root Mean Square Residual. The current analyses used full information maximum likelihood estimation<sup>38</sup> to adjust for uncertainty associated with missing data. Mediation effects (ie, specific and total indirect effects) were assessed using the multivariate  $\delta$  method.<sup>39</sup> This method estimates significance for the product of 2 regression coefficients, the coefficient for the mediator regressed on the predictor and the coefficient for the outcome regressed on the mediator adjusted for the predictor and is consistent with criteria recommended by MacKinnon et al.<sup>40</sup> Mplus<sup>41</sup> was used to fit the measurement and the latent growth models. SEs were adjusted for clustering by school.<sup>41</sup>

## RESULTS

Demographic characteristics for time 1 of the study, as shown in Table 1, indicated that the students in seventh grade were 12.51 (SD = 0.54) years old. Thirteen percent were non-Hispanic whites and 48% were Hispanic. Boys reported significantly more alcohol use than girls for past 30-day use of beer, lifetime bingeing with beer, and past 30 days bingeing with beer, and boys reported more negative consequences as a result of alcohol use. Participants more likely to have been lost to follow-up included those in wave 1 who knew peers (odds ratio [OR] = 1.30; 95% confidence interval [CI] = 1.16–1.44) or adults (OR = 1.13; 95% CI



= 1.05–1.21) who drank alcohol, were exposed to more alcohol commercials on popular shows (OR = 1.28; 95% CI = 1.01–1.61), or were Asian compared with whites (OR = 2.00; 95% CI = 1.30–3.08). There was no difference for those lost to follow-up based on gender, age acculturation, participation in sports, parents' education, lifetime or past 30-day alcohol use, alcohol-related problems, TV viewing, self-reported exposure to advertisements, or liking of alcohol advertisements.

### Measurement Model

The measurement model examined the factor loading, simple structure, and measurement invariance of the latent variables proposed for the models. Indicators loaded well on their hypothesized latent variables in separate models for girls and boys. Examination of a priori hypothesized modification indices for cross-loadings among the alcohol use, alcohol-related problems, ad exposure, and liking of ads target latent factors provided support for a simple structure among the factors. The measurement model findings for the alcohol-related problems factor warranted the use of parcels of indicators in the structural model to provide more stable model estimation.<sup>36,42</sup> Tests for invariance of loadings and thresholds in a multigroup model by gender was adequate to compare structural models across gender.<sup>43</sup> Similar tests for invariance of loadings and thresholds in a multigroup model by grade provided evidence for invariance across time for items measuring alcohol use in the growth curves.

### Latent Growth Models

The latent growth factors for alcohol use over times 1 through 3 and the latent factor for alcohol-related problems were regressed on each of the 4 alcohol ad exposure measures in 4 separate series of model evaluations.

TABLE 1 Demographic Information for Participants in Seventh Grade

Item	Total	Girls	Boys
Gender, <i>n</i> (%)	3890 (100)	1905 (50.14)	1894 (49.86)
Age, mean (SD)	12.51 (0.54)	12.51 (0.54)	12.51 (0.53)
Ethnicity, <i>n</i> (%)			
White/non-Hispanic	520 (13.37)	261 (13.78)	259 (13.60)
Hispanic	1862 (47.87)	937 (49.47)	923 (48.45)
Asian	682 (17.02)	324 (17.11)	338 (17.74)
Black/African American	120 (3.08)	56 (2.96)	64 (3.36)
Native Hawaiian or Pacific Islander	30 (0.77)	15 (0.79)	15 (0.79)
American Indian or American Native	37 (0.95)	17 (0.90)	20 (1.05)
Don't know	491 (12.62)	196 (10.35)	206 (10.81)
Mixed	168 (4.32)	88 (4.65)	80 (4.20)
Language acculturation, mean (SD)	4.22 (0.76)	4.14 (0.79)	4.28 (0.72)
At least 1 drink of beer in lifetime, <i>n</i> (%)			
0 d	1595 (56.94)	842 (59.21)	753 (54.60)
1 d	532 (18.99)	260 (18.28)	272 (19.72)
2 d	242 (8.64)	123 (8.65)	119 (8.63)
3 to 9 d	216 (7.71)	101 (7.10)	115 (8.34)
10 to 19 d	86 (3.07)	39 (2.74)	47 (3.41)
20 to 39 d	50 (1.79)	24 (1.69)	26 (1.89)
40 to 99 d	30 (1.07)	15 (1.05)	15 (1.09)
100 or more days	50 (1.79)	18 (1.27)	32 (2.32)
At least 1 drink of beer in past 30 days, <i>n</i> (%) <sup>a</sup>			
0 d	2414 (83.18)	1243 (84.44)	1171 (81.89)
1 d	281 (9.68)	140 (9.51)	141 (9.86)
2 d	90 (3.10)	40 (2.72)	50 (3.50)
3 to 5 d	55 (1.90)	20 (1.36)	35 (2.45)
6 to 9 d	27 (0.93)	16 (1.09)	11 (0.77)
10 to 19 d	9 (0.31)	6 (0.41)	3 (0.21)
20 to 29 d	6 (0.21)	3 (0.20)	3 (0.21)
All 30 d	20 (0.69)	4 (0.27)	16 (1.12)
At least 1 drink of wine or liquor in lifetime, <i>n</i> (%)			
0 d	1799 (64.67)	934 (66.15)	865 (63.14)
1 d	455 (16.36)	215 (15.23)	240 (17.52)
2 d	210 (7.55)	113 (8.00)	97 (7.08)
3 to 9 d	153 (5.50)	78 (5.52)	75 (5.47)
10 to 19 d	69 (2.48)	33 (2.34)	36 (2.63)
20 to 39 d	40 (1.44)	17 (1.20)	23 (1.68)
40 to 99 d	23 (0.83)	0 (0.64)	14 (1.02)
100 or more days	33 (1.19)	13 (0.92)	20 (1.46)
At least 1 drink of wine or liquor in past 30 days, <i>n</i> (%)			
0 d	2422 (83.81)	1246 (85.05)	1176 (82.53)
1 d	272 (9.41)	124 (8.46)	148 (10.39)
2 d	105 (3.63)	54 (3.69)	51 (3.58)
3 to 5 d	34 (1.18)	17 (1.16)	17 (1.19)
6 to 9 d	23 (0.80)	14 (0.96)	9 (0.63)
10 to 19 d	10 (0.35)	5 (0.34)	5 (0.35)
20 to 29 d	6 (0.21)	2 (0.14)	4 (0.28)
All 30 d	18 (0.62)	3 (0.20)	15 (1.05)
3 or more drinks of beer in a row in lifetime, <i>n</i> (%) <sup>a</sup>			
0 d	2432 (88.12)	1258 (89.92)	1174 (86.26)
1 d	134 (4.86)	61 (4.36)	73 (5.36)
2 d	70 (2.54)	33 (2.36)	37 (2.74)
3 to 9 d	45 (1.63)	13 (0.93)	32 (2.35)
10 to 19 d	26 (0.94)	13 (0.93)	13 (0.96)
20 to 39 d	25 (0.91)	14 (1.00)	11 (0.81)
40 to 99 d	8 (0.29)	2 (0.14)	6 (0.44)
100 or more days	20 (0.72)	5 (0.36)	15 (1.10)
3 or more drinks of beer in a row in past 30 days, <i>n</i> (%) <sup>a</sup>			
0 d	2688 (92.91)	1383 (94.40)	1305 (91.39)
1 d	105 (3.63)	47 (3.21)	58 (4.06)
2 d	34 (1.18)	14 (0.96)	20 (1.40)
3 to 5 d	25 (0.86)	9 (0.61)	16 (1.12)

TABLE 1 Continued

Item	Total	Girls	Boys
6 to 9 d	11 (0.38)	5 (0.34)	6 (0.42)
10 to 19 d	7 (0.24)	3 (0.20)	4 (0.28)
20 to 29 d	6 (0.21)	2 (0.14)	4 (0.28)
All 30 d	17 (0.59)	2 (0.14)	15 (1.05)
3 or more drinks of wine or liquor in lifetime, <i>n</i> (%)			
0 d	2448 (89.15)	1263 (90.67)	1185 (87.58)
1 d	135 (4.92)	55 (3.95)	80 (5.91)
2 d	58 (2.11)	31 (2.23)	27 (2.00)
3 to 9 d	43 (1.57)	20 (1.44)	23 (1.70)
10 to 19 d	20 (0.73)	9 (0.65)	11 (0.81)
20 to 39 d	17 (0.62)	7 (0.50)	10 (0.74)
40 to 99 d	6 (0.22)	2 (0.14)	4 (0.30)
100 or more days	19 (0.69)	6 (0.43)	13 (0.96)
3 or more drinks of wine or liquor in past 30 days, <i>n</i> (%)			
0 d	2707 (93.73)	1384 (94.60)	1323 (92.84)
1 d	92 (3.19)	43 (2.94)	49 (3.44)
2 d	30 (1.04)	16 (1.09)	14 (0.98)
3 to 5 d	18 (0.62)	10 (0.68)	8 (0.56)
6 to 9 d	13 (0.45)	4 (0.27)	9 (0.63)
10 to 19 d	7 (0.24)	2 (0.14)	5 (0.35)
20 to 29 d	6 (0.21)	2 (0.14)	4 (0.28)
All 30 d	15 (0.52)	2 (0.14)	13 (0.91)
Consequences of alcohol use, mean (SD) <sup>b</sup>	0.09 (0.41)	0.08 (0.38)	0.11 (0.44)

<sup>a</sup> Alcohol use by student gender was significant for past 30-days use of beer, lifetime bingeing with beer, and past 30- days bingeing with beer (all  $\chi^2(7) > 14.07, P < .05$ ), but all other comparisons of alcohol use by student gender were nonsignificant (all  $P > .05$ ).

<sup>b</sup> Consequences of alcohol use differed by gender ( $t(2648) = -2.15, P < .05$ );  $P =$  proportion.

The hypothesized moderator, liking of alcohol ads, was included in each of the 4 models. In addition, the growth factors were simultaneously regressed on covariates measured at time 1, including age, observing peers drink, observing adults drink, playing sports, general TV watching, language acculturation, and socioeconomic status (occupation and education of each participant's parents). All structural growth models differed by gender, so only those results for multigroup models by gender are presented here.

As shown in Table 2 and Fig 2, the coefficient for the intercept regressed on the interaction term was significant for boys and for girls. Figure 3 depicts this interaction illustrating that the level of exposure to ads was more predictive of alcohol use in seventh grade for those students who reported a greater liking of alcohol ads. There was no interaction in the prediction of the slope for the latent growth for alcohol use.

Significant mediation effects or indirect effects were observed among girls for the path from exposure to ads on popular shows at time 1 through the growth curve slopes to problems at time 4 ( $\delta$  method indirect effect:  $ab = 0.091, P = .02$ ) and for the path from liking of ads at time 1 through the growth curve intercepts to problems at time 4 ( $ab = 0.105, P = .03$ ). Among boys, there was a significant total effect of the interaction term for popular shows and liking of ads at time 1 on problems at time 4, which included the direct effect on time 4 problems and indirect effects through the intercept and slope ( $\delta$  method total effect:  $b = 0.164, P = .02$ ). These effects among girls and boys were significant even after adjustment for time 1 problems, age, friends drinking, adults drinking, playing sports, general TV watching, acculturation, parents' jobs, parents' education, and clustering by school.

The covariates, alcohol-related problems at time 1 and friends and close

adult drinking at time 1, were significant predictors of the intercept for girls. The same covariates plus language acculturation and parent jobs were significant predictors of the intercept for boys. For boys, drinking by friends and language acculturation were significant predictors of the slope, and the sign of the coefficients for these predictors changed between the intercept and the slope, suggesting that those higher in alcohol use at time 1 might have had lower growth rates than those lower in use at time 1. None of the time 1 variables were significant direct-effect (unmediated) predictors of alcohol-related problems at time 4 for boys or girls.

Mediation models for the other 3 exposure measures (frequency of watching sports show, cued recall of ads, and self-reported frequency of seeing alcohol ads) fit the data very well (results not shown). In all 3 models for girls, the intercept for the growth of alcohol use mediated the influence of liking of alcohol ads at time 1 on alcohol-related problems at time 4. No other indirect effects were significant for girls or boys. In these 3 mediation models for girls, both the intercept and slope for the growth of alcohol use were positive predictors of the level of alcohol-related problems at time 4, whereas this was not the case for boys.

## DISCUSSION

This study provides evidence supporting the hypothesis that exposure to alcohol advertising and affective reactions to those advertisements on television influence underage drinking and the development of alcohol-related problems. The growth of alcohol use from the seventh through the ninth grades is predicted by the frequency of watching popular shows and self-reports on the liking of alcohol ads. In partial support of hypothesis 1, there

is a significant interaction between exposure to ads and liking of ads in the prediction of the intercept (but not the slope) for a growth curve modeled across these grade levels for both male and female students. The interaction shows that the level of exposure to ads is more predictive of a higher level of alcohol use in seventh grade for those students who report a greater liking of alcohol ads. In addition to this interaction observed at time 1, the frequency of watching popular shows at time 1 predicts the slope for the growth of alcohol use for girls, and the liking of alcohol ads at time 1 predicts the slope for boys.

In support of hypothesis 2, the mediation model shows that the influence of alcohol ads at time 1 on the occurrence of alcohol-related problems at time 4 is mediated by the growth of alcohol use. Among girls, there was a significant indirect effect of exposure to ads on popular shows in time 1 on problems in time 4 through the growth of alcohol use, and among boys, there was a significant total effect from the shows and liking interaction term in time 1 to problems in time 4. These relationships are significant even after adjusting for a range of other covariates measured at time 1 that are known to be associated with alcohol use. The other 3 measures of exposure to alcohol advertising show similar findings, although these measures are somewhat less predictive of the growth in alcohol use and alcohol-related problems.

Although causality cannot be verified in 1 observational study, the relevant theories and empirical evidence from the current prospective study and previous research are consistent with possible causal effects linking alcohol advertising to underage alcohol use and alcohol-related problems. In the current study, measures of exposure at time 1 are associated with the increasing use of alcohol over time and the

TABLE 2 Standardized Parameter Estimates for the Mediation Model

	Girls		Boys	
	Parameter Estimate	SE	Parameter Estimate	SE
Intercept on				
T1 alcohol use	0.759***	0.046	0.821***	0.038
T2 alcohol use	0.590***	0.060	0.643***	0.047
T3 alcohol use	0.466***	0.056	0.506***	0.030
Slope on				
T1 alcohol use	0.000	0.000	0.000	0.000
T2 alcohol use	0.404***	0.036	0.349***	0.057
T3 alcohol use	0.640***	0.056	0.549***	0.101
T4 alcohol-related problems on				
T4 problems 1	0.707***	0.029	0.720***	0.035
T4 problems 2	0.692***	0.039	0.721***	0.056
T4 problems 3	0.705***	0.038	0.736***	0.048
T4 problems 4	0.734***	0.050	0.780***	0.037
Intercept on T1 predictors				
Popular shows	-0.052	0.034	-0.027	0.031
Liking of ads	0.267***	0.047	0.171***	0.028
Shows x Liking	0.091*	0.042	0.093*	0.046
T1 problems	0.297*	0.123	0.264**	0.084
Age	0.030	0.031	0.040	0.030
Peer drinking	0.426***	0.060	0.539***	0.052
Playing sports	0.006	0.043	-0.009	0.024
Adult drinking	0.155***	0.036	0.138**	0.053
General TV viewing	0.012	0.034	0.012	0.037
Language acculturation	0.050	0.042	-0.098*	0.040
Parents' jobs	0.000	0.041	0.112*	0.046
Parents' education	-0.041	0.045	-0.002	0.030
Slope on T1 predictors				
Popular shows	0.190**	0.058	0.113	0.063
Liking of ads	-0.021	0.078	0.129*	0.060
Shows x Liking	-0.083	0.068	-0.112	0.081
T1 problems	-0.125	0.135	0.076	0.156
Age	0.031	0.039	-0.075	0.068
Peer drinking	0.057	0.075	-0.483***	0.128
Playing sports	-0.137	0.073	-0.015	0.074
Adult drinking	-0.029	0.067	-0.103	0.119
General TV viewing	-0.021	0.064	-0.059	0.062
Language acculturation	0.029	0.073	0.227*	0.097
Parents' jobs	0.130	0.075	-0.135	0.109
Parents' education	-0.085	0.064	0.009	0.090
T4 alcohol-related problems on				
Intercept	0.393*	0.166	0.177	0.303
Slope	0.478***	0.106	0.179	0.214
Popular shows	-0.054	0.065	-0.007	0.058
Liking of ads	-0.102	0.064	-0.095	0.062
Shows x Liking	0.040	0.072	0.167	0.094
T1 problems	0.050	0.070	0.014	0.090
Age	0.036	0.049	-0.004	0.034
Peer drinking	-0.022	0.085	0.234	0.214
Playing sports	0.050	0.059	0.027	0.044
Adult drinking	-0.027	0.041	0.021	0.074
General TV viewing	0.022	0.062	-0.021	0.063
Language acculturation	0.013	0.063	-0.048	0.086
Parents' jobs	-0.003	0.103	0.061	0.092
Parents' education	0.006	0.064	-0.018	0.100
Intercepts for latent factors				
Problems with alcohol at T4	0.000	0.000	0.232	0.184
Growth curve intercept	0.526***	0.032	0.496***	0.032
Growth curve slope	0.495***	0.059	0.441***	0.104
Residual variances				
T4 problems 1	0.500***	0.041	0.482***	0.050

TABLE 2 Continued

	Girls		Boys	
	Parameter Estimate	SE	Parameter Estimate	SE
T4 problems 2	0.522***	0.054	0.481***	0.080
T4 problems 3	0.502***	0.054	0.458***	0.071
T4 problems 4	0.462***	0.074	0.392***	0.058
T1 alcohol use	0.424***	0.070	0.326***	0.063
T2 alcohol use	0.513***	0.049	0.631***	0.046
T3 alcohol use	0.404***	0.075	0.648***	0.067
Intercept	0.386***	0.096	0.253**	0.077
Slope	0.921***	0.055	0.686***	0.087
T4 alcohol-related problems	0.661***	0.061	0.849***	0.054
Effects from Shows to Problems				
Total	0.017	0.051	0.008	0.046
Total indirect	0.070	0.042	0.015	0.028
Indirect Shows – I – Problems	–0.021	0.018	–0.005	0.009
Indirect Shows – S – Problems	0.091*	0.040	0.02	0.028
Direct Shows – Problems	–0.054	0.065	–0.007	0.058
Effects from Liking to Problems				
Total	–0.007	0.063	–0.042	0.041
Total indirect	0.095	0.057	0.053	0.058
Indirect Liking – I – Problems	0.105*	0.048	0.030	0.052
Indirect Liking – S – Problems	–0.010	0.038	0.023	0.030
Direct Liking – Problems	–0.102	0.064	–0.095	0.062
Effects from Interaction SxL to Problems				
Total	0.036	0.066	0.164*	0.069
Total indirect	–0.004	0.040	–0.004	0.045
Indirect from SxL – I – Problems	0.036	0.026	0.016	0.032
Indirect from SxL – S – Problems	–0.039	0.031	–0.020	0.029
Direct from SxL – Problems	0.040	0.072	0.167	0.094

I, intercept factor for growth curve; na, not available, slope variance fixed at 0; S, slope factor for growth curve; SxL, interaction term for popular shows and liking of alcohol ads; T1, time 1; T2, time 2; T3, time 3.

\*  $P < .05$ .

\*\*  $P < .01$ .

\*\*\*  $P < .001$ .

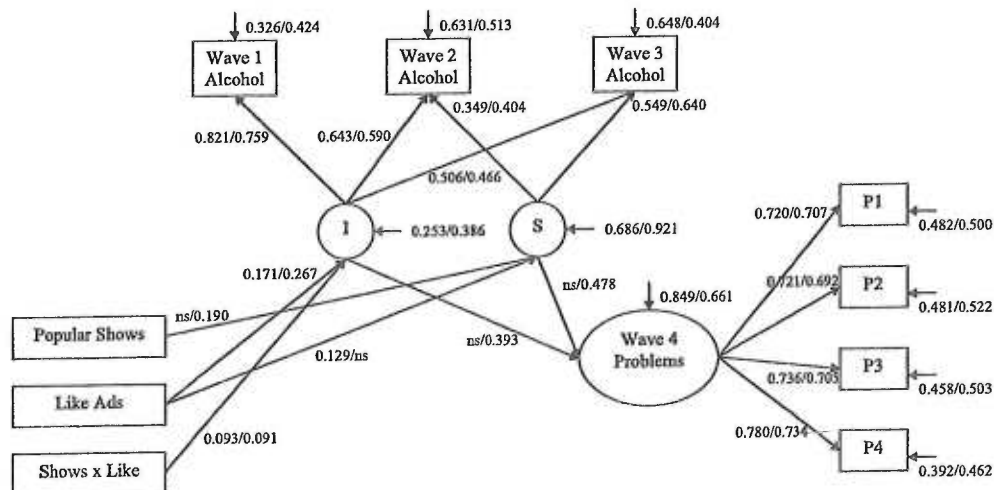
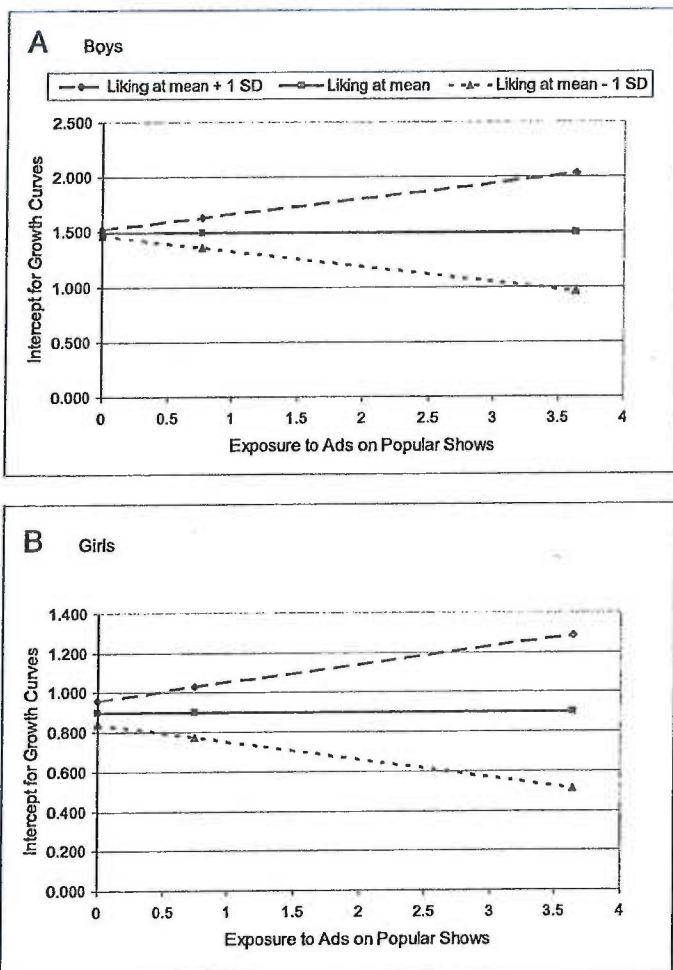


FIGURE 2

Mediation model for alcohol-related problems. Alcohol use = past 30 days + past 6 months. I, growth curve intercepts; S, growth curve slopes. Standardized parameter estimates: boys/girls ( $P < .05$ ). Paths that were nonsignificant for both boys and girls are not included in the figure for clarity (eg, the direct effect of popular shows on wave 4 problems was not significant and is not shown). Adjusted for wave 1 problems, age, drinking peers, drinking adults, playing sports, general TV watching, acculturation, parents' jobs, parents' education, and clustering by school. Fit indices:  $\chi^2(130) = 182.66$ ,  $P = .002$ ; Comparative Fit Index = 0.98; Tucker-Lewis Index = 0.97; Root Mean Squared Error of Approximation = .015; Standardized Root Mean Square Residual = .026. ns = non-significant.

development of alcohol-related problems at time 4, demonstrating a temporal ordering of predictors and outcomes. In addition, the models for this study control for a range of potentially confounding variables, including strong predictors, such as previous alcohol-related problems and peer influences. In previous studies, the indirect measure of exposure to alcohol ads on popular shows is predictive of alcohol use<sup>22,26</sup> and measures for liking of alcohol ads are predictive of alcohol use.<sup>5,6,10,15</sup>

The findings here are also consistent with well-established theories on vicarious learning, such as Social Learning Theory,<sup>44</sup> theories on persuasive messages in the media, such as the Elaboration Likelihood Model,<sup>16</sup> and with the more recent Message Interpretation Process model by Austin and colleagues.<sup>5</sup> Austin and colleagues<sup>5</sup> provide evidence for the influence of alcohol advertising on alcohol use through a number of affective mediators, including liking of advertisements.<sup>5,45</sup> Liking or desirability of alcohol advertisements predicts identification with



**FIGURE 3** Interaction of exposure to ads with liking of ads. Liking of ads plotted at the mean, the mean plus 1 SD, and the mean minus 1 SD.

portrayals of alcohol use in advertisements, which, in turn, predicts liking of brands of beer and positive expectancies for alcohol use. The overall influence of liking of advertisements on alcohol use might be somewhat larger in the current model if these mediating pathways were taken into account. In another study of advertising, Austin et al<sup>16</sup> found that a media-literacy intervention increased skepticism (reduced liking) for advertising, as expected, but also increased recall of advertisement. This is consistent with the current study where memory and

liking of advertisements interact. That is, a greater memory for alcohol advertisement does not necessarily mean an increase in alcohol use; it also depends on liking of the advertisements. This combination of theory and empirical evidence across research teams provides reasonably good support for the influence of exposure to alcohol advertisements on alcohol use and alcohol-related problems among adolescents.

A few limitations warrant discussion. First, the current results may be generalized only to public school students

in the Los Angeles area. Second, alcohol use measures among young adolescents are often skewed toward 0, and this is true in the current sample. Seventh graders were actually recruited because of their low levels of alcohol use to examine the early development of alcohol use, but, unfortunately, these skewed measures may have contributed, in part, to some of the null findings in this study. Finally, not all results converge across multiple measures of exposure to advertising, but there is little literature available that indicates which exposure measures are optimal. However, it may not be surprising that cued recall of advertisements was not predictive of alcohol use. In the communication theory of Lang,<sup>47</sup> cued recall is thought to be a less effective measure of retrieval/accessibility of information than it is a measure of encoding/availability of information.<sup>47</sup> In encoding specificity<sup>48</sup> and transfer-appropriate processing<sup>49</sup> views, cued recall would reflect good accessibility and predictability at the time of drinking decisions only if the retrieval cues at test overlap well with retrieval cues during these later decisions; such overlap is unlikely, as the test cues were still pictures of commercials. However, the use of the indirect measure of exposure on popular shows and liking of ads are used successfully across a range of studies, and, in particular, liking of ads, although not strictly a measure of exposure, is used across product categories to predict the success of individual ads or ad campaigns.<sup>18</sup>

## CONCLUSIONS

The accumulation of evidence for the influence of televised alcohol advertisements on underage drinking has important implications for prevention. First, children can be taught about the design of persuasive messages in the media early to help them avoid undue

influence by the media on their behaviors.<sup>45,50</sup> Second, it is important to have a comprehensive policy to limit the exposure of children to alcohol ads on television and on other media, such as the Internet, print media, and display ads. Although there are other influences on

underage drinking, including those of peers and adults, prevention strategies should address the influence of alcohol ads as part of an overall strategy to prevent early initiation of alcohol use and the development of problems related to consumption.

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## APPENDIX Assessments

Assessment	Items	$\alpha$	Example Item	Response Option Anchors
Current frequency and quantity of alcohol use <sup>20</sup>	9	0.91	During the last 30 d, on how many days did you...have at least 1 drink of beer?	0 = 0 d 7 = all 30 d
Problems associated with alcohol use <sup>21</sup>	8	0.93	How many times have you ever...gone to school drunk?	1 = never 4 = more than 10 times
Exposure to alcohol advertising <sup>a</sup> on popular shows <sup>22</sup>	20	0.79	How frequently do you watch MTV?	1 = never 6 = every day
Exposure to alcohol advertising <sup>a</sup> on sports shows <sup>22,23</sup>	6	0.80	How often to you watch professional football?	1 = never 6 = every day
Cued recall memory for alcohol advertisements <sup>24</sup>	15	0.74	What product is being advertised in the photo?	Open-ended
Self-reported observation of alcohol advertisements <sup>25</sup>	4	0.72	In the past week, how many commercials have you seen for alcohol drinks like beer, wine, or liquor?	0 = none 6 = 6 or more
Liking of alcohol advertisements <sup>26</sup>	3	0.78	Of all the commercials you see on TV, how much do you like the TV commercials for alcohol?	1 = I like alcohol commercials the most 4 = I like the alcohol commercials the least
Propensity to watch TV <sup>27,28</sup>	7	0.79	On a typical weekday, how many hours a day do you watch TV...after school before dinner?	1 = I do not watch TV 5 = 5 h or more
Observed drinking by peers and friends <sup>29</sup>	4	0.86	About how often did you do the following things in the last 6 mo...saw someone your age drink beer or other alcohol?	0 = never 6 = every day
Observed drinking by known adults <sup>30</sup>	3	0.84	About how often did you do the following things in the last 6 mo...saw an adult you know well drink alcohol?	0 = never 6 = every day
Participation in sports <sup>31</sup>	5	0.73	About how often did you do the following things in the last 6 mo... played soccer?	0 = never 6 = every day
Language acculturation <sup>32,33</sup>	3	0.67	What language(s) do you usually speak at home?	1 = only English 5 = only another language
Socioeconomic status <sup>51</sup>	2	na	What is the highest grade completed by your mother?	1 = not completed elementary school 6 = Completed graduate school
Socioeconomic status <sup>51</sup>	2	na	What type of work does your father do?	Open-ended (coded)

na, not applicable.

<sup>a</sup> The frequency of watching popular shows or sports programs was weighted by the frequency of alcohol advertisements broadcast on those shows in the previous 10 mo, as reported by Nielsen Media Research (see text).



## Exposure to Alcohol Advertisements and Teenage Alcohol-Related Problems

Jerry L. Grenard, Clyde W. Dent and Alan W. Stacy  
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# The Prevalence of Harmful Content on Outdoor Advertising in Los Angeles: Land Use, Community Characteristics, and the Spatial Inequality of a Public Health Nuisance

Bryce C. Lowery, MS, MLA, and David C. Sloane, PhD

Outdoor advertising provides an important perspective for understanding how land-use decisions impact community health. Although economic factors and zoning determine its placement, growing evidence suggests that harmful content can have adverse effects on neighborhood environments, residential quality of life, and human well-being. Outdoor advertising is an indicator of the ways social processes, land use, and the built environment interact to influence public health because of its connection to fundamental, intermediate, and proximate determinants of health promotion.<sup>1</sup>

Although outdoor advertising represents a key moneymaker for landowners, as well as a tourist attraction for local businesses, accumulated evidence suggests that outdoor advertising with harmful content disadvantages particular communities, similarly to other studies documenting toxic facilities,<sup>2</sup> liquor stores,<sup>3</sup> and food deserts.<sup>4</sup> Given this evidence, the recent increase in billboards in many cities around the United States, and especially around the world,<sup>5</sup> raises important public health concerns. In this way, billboards are part of the neighborhood effect<sup>6</sup> that inhibits positive public health outcomes for vulnerable communities.

Studies demonstrating the adverse effects of outdoor advertising generally focus on a specific area of public health such as obesity, smoking cessation, or substance abuse; some are cross-sectional, and a number compare outdoor advertising in areas that are regulated by different zoning and land-use regulations. Developing a methodology that allows public health and planning professionals to examine the issue longitudinally, over neighborhoods governed by similar land-use regulations, aids in determining the extent to which land use and

*Objectives.* Our study sought to examine associations between the content of outdoor advertising and neighborhood ethnic/racial and socioeconomic composition to see whether particular communities disproportionately host harmful content.

*Methods.* We constructed a spatial database of photographs taken from June 2012 until December 2012 in 7 identically zoned communities in Los Angeles, California, to compare outdoor advertising area and content. We selected communities to contrast by ethnicity/race, income, education, and youth population.

*Results.* At-risk communities and communities of color hosted more outdoor advertising depicting harmful content than other communities. Among included neighborhoods, harmful content and the proportion of outdoor advertising overall were most prevalent in communities of Asian Americans and Latino Americans. In all communities, harmful content represented at least 24% of outdoor advertising space.

*Conclusions.* This study provides evidence of the potential for land-use decisions to result in spatially inequitable health impacts. Although dictating the placement of outdoor advertising through zoning may seem sensible, such a decision might have the unintended consequence of disadvantaging the well-being of local communities. Neighborhood factors require more contextually nuanced public health and land-use policy. (*Am J Public Health*. Published online ahead of print February 13, 2014; e1–e7. doi:10.2105/AJPH.2013.301694)

zoning contribute to outdoor advertising proliferation. A coding procedure that systematically examines the breadth of related public health concerns is critical to understanding how outdoor advertising functions collectively to create a nuisance and promote unhealthy behaviors.

Linkages between outdoor advertising and a range of public health issues include problem drinking,<sup>7–10</sup> tobacco use,<sup>11</sup> environmental pollution caused by the intense light,<sup>12–14</sup> and the obesity epidemic.<sup>15–17</sup> Additionally, when used to promote alcohol, gambling, entertainment, and clothing, outdoor advertising also promotes the potential exclusion—or at least harassment—of women in public spaces.<sup>18,19</sup> Repeated exposure to media, such as outdoor advertising that depicts guns and gun-related violence, may contribute to aggressive behavior,<sup>20</sup> tolerance of violence,<sup>21</sup> and desensitization to weapons,<sup>22</sup> thus reducing the perceived

risks associated with guns through their commonplace occurrence in public space. Outdoor advertising correlates to themes opposed to health promotion and harm reduction, essentially endorsing the misogynistic portrayals of women and promoting adverse health behaviors such as violence, smoking, excessive drinking, and unhealthy eating.

Furthermore, evidence suggests that disadvantaged and vulnerable communities experience the impacts of outdoor advertising disproportionately. Advertising presents a heightened nuisance in communities with lower educational attainment,<sup>23</sup> places dense with children<sup>24</sup> and minorities,<sup>23,24</sup> as well as communities having a lower socioeconomic status, as defined by income and occupation.<sup>25</sup> Additionally, harmful advertising with portrayals of alcohol and tobacco appear to be disproportionately located in minority communities,<sup>26–30</sup> often adjacent to child-serving

places, such as schools and playgrounds.<sup>30-33</sup> And, research shows that more affluent neighborhoods tend to be protected against outdoor advertising, specifically advertising that promotes tobacco use<sup>23,34</sup> and obesity.<sup>15</sup>

A few studies suggest that outdoor advertising may have positive health effects by communicating health information and projecting healthy perceptions of activity. In a particular study, outdoor advertisements about sun protection were found to complement other media, such as television and magazine advertisements, in promoting actions that guard against skin cancer.<sup>35</sup> In another study, outdoor advertising in a community correlated positively with physical activity and walking.<sup>36</sup> The researchers suggest that outdoor advertisements, like billboards, may serve to increase the perception that a place is a pleasant, thriving community of human activity.

This article reports on a study in Los Angeles, California, where in recent years the city has been considering revisions to its existing signage ordinance. These revisions were prompted by the sudden proliferation of outdoor advertising because of advancements in technology that allowed for vinyl supergraphics to be affixed to the façade of almost any structure and the conversion of 101 conventional billboards into digital billboards. Because these technologies were not explicitly addressed by past land-use regulation, the legality of such signs was vague. In response, the City of Los Angeles placed a moratorium on all new outdoor advertising and proposed legislation that would limit outdoor advertising to 21 commercially zoned sign districts in regional centers around the city. These areas cover 2.45 miles of Los Angeles or 0.4% of the total land area.

Outdoor advertising, or out-of-home advertising, is a term used to denote a category of signage that advertises goods or services that are not made or sold at the location of the sign. In legal and regulatory terms, these signs generally adhere to a different set of land-use regulations than signs that promote the business being conducted at the location of the sign. They are often referred to as off-premise<sup>37</sup> or off-site<sup>38</sup> advertising. In Los Angeles and other cities, off-site signs are represented by both conventional and digital billboards that come in a variety of sizes ranging in area from 7920

square feet to 96 786 square feet, as well as smaller posters that appear on bus benches and transit kiosks that range in size from 1856.25 square feet to 3082 square feet in area.

This research improves upon previous studies in 2 important ways. First, by selecting spatial sampling units from the proposed regional centers in Los Angeles, it addresses concerns regarding the complications of making land-use comparisons across municipalities because of differences in population density, urban form, and land-use regulations.<sup>27</sup> Second, the study employs multiple measures to capture how residents experience outdoor advertising along the sidewalks and streets in the community, street length,<sup>27,29</sup> and number of intersections.<sup>39</sup>

## METHODS

We selected 7 sites from the 21 proposed sign districts using census tracts within 500 feet of each regional center. Following a process of landscape assessment,<sup>40</sup> ArcGIS version 10.1 (ESRI, Redlands, CA) and data from the 2010 US Census and the 2010 American Community Survey estimates were used to select sites based on previously identified indicators of outdoor advertising impact. Key indicators included race/ethnicity, formal education, poverty, and number of children.

### Data

Data on race and ethnicity were derived from the United States Census 2010 Profile of General Population and Housing Characteristics (DP-1). Census tracts were coded to indicate areas of racial and ethnic homogeneity. Coding reflected areas in which 1 race or ethnicity served as a plurality of the total population.

Data on income were derived from the United States Census 2010 American Community Survey Five Year Estimates for Selected Economic Characteristics (DP03). Census tracts were coded to indicate areas of concentrated poverty. Coding reflected areas where the percentage of families and people whose income in the last 12 months is below poverty level was greater than 25.40% – 1 standard deviation (11.94) from the population mean (13.46%).

Data on education were derived from the United States Census 2010 American

Community Survey Five Year Estimates for Selected Social Characteristics (DP02). Census tracts were coded to identify communities with less formal education. Coding indicated areas where the percentage of high school graduates or higher was less than 54.91% – 1 standard deviation (19.18) from the population mean (74.10%).

Data on age were derived from the United States Census 2010 Profile of General Population and Housing Characteristics (DP-1). Census tracts were coded to identify communities with greater number of youths. Coding indicated areas where the percentage of individuals older than 18 years was less than 68.62% – 1 standard deviation (7.40) from the population mean (76.02%).

Data on the area of each sign district, street length, and number of intersections were derived from street and land use shape files available from the City of Los Angeles Department of City Planning (<http://planning.lacity.org>).

Table 1 illustrates the population characteristics of all 21 regional centers and downtown Los Angeles. The selected regional centers include: 1 community of African American residents (Baldwin Hills); 4 Latino communities (1 with a concentration of youths [Boyle Heights North], 1 with an increased risk of poverty [City West], 1 with a concentration of youths and multiple other risks including increased risk of poverty and increased educational risk [Boyle Heights South], and 1 without distinguishing characteristics with regard to age, income, and education [Van Nuys]); 1 Asian American neighborhood (Chinatown); and 1 community of White residents (Encino).

### Analysis

To determine if harmful content is differentially situated in the communities in this study, we employed urban tomography,<sup>41</sup> using a longitudinal sample of 3416 photographs representing the location and changing content of approximately 585 outdoor advertisements found in the 7 selected regional centers. Because people living within 500 feet of a regional center may be exposed to outdoor advertising outside the district, a second 500-foot buffer was included to ensure full representation of the outdoor advertisements experienced by local residents. Outdoor

**TABLE 1—Descriptive Statistics for Population Variables in Census Tracts within 500 feet of Los Angeles, CA, Regional Centers: 2010 US Census**

City	Tracts, No.	Total Pop.	African American, %	Asian American, %	Latino American, %	White, %	Fell Below Poverty in Last Year, %	Youths, %	≥ High School Diploma, %
Baldwin Hills <sup>a</sup>	4	17 368	81	4	11	5	14	20	89
Ballona	2	13 641	5	10	20	77	5	8	98
Beverly Center	5	15 516	3	7	8	84	<1	8	95
Boyle Hts. North <sup>a</sup>	6	21 263	1	3	94	48	27	32	48
Boyle Hts. South <sup>a</sup>	5	18 603	1	2	95	51	37	32	39
Century City	6	25 520	2	10	5	83	3	16	97
Chinatown <sup>a</sup>	7	23 954	15	43	31	26	28	13	51
City West <sup>a</sup>	17	60 329	6	16	68	34	36	22	49
Downtown <sup>b</sup>	19	65 250	16	25	38	36	23	13	65
Encino <sup>a</sup>	6	29 802	4	6	9	83	3	19	97
Hollywood <sup>b</sup>	16	53 792	6	7	26	70	15	9	87
Hughes	5	28 877	34	10	12	45	5	<1	96
Koreatown	21	69 527	5	37	49	27	23	20	66
Los Angeles International Airport	6	16 939	14	3	76	37	19	29	61
Miracle Mile	11	38 722	8	18	9	67	7	16	95
Northridge	5	20 257	4	15	40	58	12	23	79
Panorama City	9	33 745	3	11	78	39	24	31	54
San Pedro	3	10 248	11	6	61	46	30	23	60
Universal City	5	15 815	5	8	10	80	1	13	97
Van Nuys <sup>a</sup>	6	25 448	5	5	63	53	19	26	63
Warner Center	9	34 881	6	15	26	62	7	19	88
Westwood	5	15 715	4	25	7	63	19	7	96

<sup>a</sup>Case study site.

<sup>b</sup>Previously existing sign district.

advertisements found within 1000 feet of each of these proposed sign districts were included in the analysis. Photographs were taken monthly, during the last week of each month from June 2012 until December 2012.

For this study, we coded harmful content into 5 categories. We guided categorization by applying an analytical construct derived from

previous research regarding risk associated with specific types of harmful advertising content, as well as a focus on at-risk and sensitive populations such as children, women, individuals prone to addiction and substance abuse, and those inclined toward violent or antisocial behavior. Categories included outdoor advertisements that encourage (1) addictive

behaviors such as alcohol use, tobacco use, and gambling; (2) violence through the depiction of weapons or crime; (3) unhealthy eating by promoting high-calorie, low-nutrition food; (4) unsafe environments for women through misogynistic portrayals and advertisements for strip clubs; and (5) content that has been deemed inappropriate for young children such

**TABLE 2—Descriptive Statistics for Environmental Variables of Selected Los Angeles Regional Centers: California, December 2012**

Race/Ethnicity (Location)	Total Ads, No.	Total Area of Ads, Sq Ft	Area of Sign District, Sq. Miles	Street Length, Lane Miles	Total Intersections, No.
African American (Baldwin Hills)	59	5963.85	1.93	16.06	25
Asian American (Chinatown)	106	8363.06	3.00	34.61	67
White (Encino)	114	17 235.63	7.45	31.98	48
Latino American (Van Nuys)	64	11 581.08	1.82	12.90	25
Latino American Youths (Boyle Heights North)	29	2764.64	1.32	8.46	30
Latino American Poverty Risk (City West)	190	14 936.70	2.49	40.43	87
Latino American Multiple Risks (Boyle Heights South)	26	4785.66	1.92	9.46	23
Total average	84	9392.97	2.85	21.99	44

Finally, incorporating the changing nature of community and the built environment over time is difficult in an analysis such as this. Though longitudinal, this study does not look historically at those who lived in these places and what the landscape looked like at various points in time. Even though the evidence suggests that here and now a spatial inequality exists in the content and placement of outdoor advertising, this inequality may not have been the case previously or may not be the case in the future. With advances in technology, researchers someday will be able to look at stored images of the landscape over time; at that point, they may be able to investigate whether these patterns are chronic or acute.

### Conclusions

These findings suggest that public health professionals and planners need to consider the ramifications of the potential adverse impacts of outdoor advertising. Given the rising economic value of outdoor advertising to developers and property owners, the new digital technologies that give advertisers the ability to continuously present new ads, and the belief among many public officials that outdoor advertising enlivens public spaces in a cosmopolitan city,<sup>43</sup> the proliferation of outdoor advertising likely will increase. If, as we found here, the current reliance on land-use zoning as a determinant for the location of outdoor advertising results in an inequitable distribution of harmful content, the current approach to regulating the placement of outdoor advertising has the potential to disadvantage the well-being of poorer, minority, and at-risk communities.

A growing number of researchers believe that the built environment is capable of collectively constituting a cumulative barrier to healthy living. Individuals who are continually confined—physically, financially, or socially—to harmful environments are at increased risk for functional decline and accelerated mortality.<sup>44</sup> In this way, outdoor advertising becomes a component of a localized environmental riskscape,<sup>45</sup> a factor among many that adversely impacts human health and well-being. For non-White, low-income residents, repeated and continued exposure to junk-strewn vacant lots,<sup>46</sup> liquor outlets,<sup>47</sup>

unhealthy food options,<sup>48</sup> and harmful advertising inhibits the attainment of personal and collective health and well-being.

Traditional zoning practice that segregates land into discrete, functionally homogenous districts seemingly fails to contribute to positive health outcomes for all communities, suggesting necessary reformation. Some researchers suggest that form-based codes and conditional-use permits provide an avenue for reducing the health risks confronting communities.<sup>49</sup> An alternative approach treats outdoor advertising around sensitive populations much like tobacco-free and drug-free schools zones, creating a buffer where either outdoor advertising in general or specific types of outdoor advertising are not permitted.<sup>32</sup> Of course, as in places like Hawaii and Maine, a more dramatic approach bans outdoor advertising altogether, which means forgoing any potential economic benefits generated by off-site advertising. In support of the development of new models, researchers need to conduct further studies to reveal how the current system of outdoor advertising adversely or positively impacts at-risk and vulnerable communities. ■

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### Contributors

B. C. Lowery guided the study design, collected and analyzed the data, and contributed to the data interpretation and article preparation. D. C. Sloane contributed to the data interpretation and article preparation.

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### Human Participant Protection

The dissertation from which this research is derived complies with the Principles of the Ethical Practice of Public Health and received approval from the affiliated university institutional review board.

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