

**Alcohol advertising visible at the street level  
in retail-dense areas of NYC**

*A Research Report from the  
New York City Department of Health and Mental Hygiene*

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### Introduction

Excessive drinking is a significant problem in the United States and in New York City (NYC). It is the third leading behavioral cause of death in the US<sup>1</sup> and has been linked to intentional and unintentional injuries, cancers, sexually transmitted infections, and other adverse health consequences.<sup>2</sup> In NYC, youth who drink and adults who binge drink are more likely to have multiple sex partners,<sup>3</sup> and an estimated one in ten hospitalizations are alcohol-related.<sup>4</sup>

Studies have shown advertisement exposure to be associated with alcohol consumption and adverse consequences related to harmful drinking behaviors.<sup>5</sup> Limiting alcohol advertising as a component of a broader alcohol control agenda can reduce underage and excessive drinking.<sup>6-8</sup> Adult and adolescent heavy drinkers have been shown to reactivate previously formed positive alcohol associations and react more attentively than non-heavy drinkers when presented with alcohol imagery.<sup>9, 10</sup> Alcohol is the drug of choice for adolescents,<sup>11</sup> and alcohol advertising has been associated with harmful drinking behaviors and outcomes in adolescents. Research has suggested that adolescents may be particularly susceptible to the influence of alcohol advertising.<sup>5, 12, 13</sup> For example, a systematic review of longitudinal studies demonstrated an increased likelihood of drinking among adolescents exposed to alcohol ads compared with those not exposed.<sup>14</sup> Similarly, an analysis of alcohol-related traffic accidents among youth drivers across all 50 states found fewer traffic-related fatalities in states that restrict alcohol advertising exposure among minors as compared to states that do not restrict exposure.<sup>15</sup>

While alcohol industry trade groups have established voluntary standards for alcohol advertising near youth-frequented locations, these standards are self-regulated and may not always be adhered to.<sup>16</sup> Furthermore, standards that restrict advertising around schools do not apply to all school and advertisement types. For example, the Beer Institute restricts alcohol advertisements on billboards to a radius of at least 500 feet around primary and secondary schools, places of worship, and public playgrounds,<sup>17</sup> This marketing standard does not apply to two- or four-year colleges that are comprised of 18–24 year olds, including many students under the legal drinking age and who suffer a high alcohol-related mortality burden.<sup>18</sup> Nor does this marketing standard apply to other types of advertisements, such as those placed indoors or at other outdoor ad

locations (i.e., phone booth or bus shelter advertisements), that are more often in close proximity to schools, places of worship, or playgrounds than billboards. The Distilled Spirits Council of the US has similar restrictions, although they apply to all types of outdoor advertisements.<sup>19</sup>

A previous study estimated the prevalence of alcohol advertisements in Central Harlem,<sup>20</sup> but to our knowledge, citywide estimates of the number of alcohol ads have not been previously reported. During the summer of 2010, the NYC Department of Health and Mental Hygiene's Bureau of Alcohol and Drug Use, Prevention, Care and Treatment worked with community youth groups to raise media awareness and count alcohol advertisements in several NYC neighborhoods, selected to investigate potential differences by neighborhood income level. The sampling consisted of nonrandom selection of entire neighborhoods in which data were collected by Health Department staff and community groups. This exploratory project's aim was not intended to be scientifically rigorous. However, Health Department staff involved with both counting advertisements and analyzing the recorded data noted that the overwhelming majority, if not all, alcohol advertisements were located in the highly commercial areas of sampled neighborhoods.

As a result of the suggestive findings of the exploratory study, the Department conducted a more scientifically rigorous follow-up study to the exploratory project. The two aims of the expanded study detailed in this report were to estimate the number of alcohol ads in NYC overall by sampling retail-dense areas of the city for alcohol advertising and to assess differences in the number of alcohol advertisements by neighborhood income level.

## Methods

We counted the number of industry alcohol advertisements on retail-dense blocks, a proxy for highly commercial areas, in NYC zip codes during one typical advertising cycle -- one calendar month. We then compared the number of alcohol ads per block in low-, medium-, and high-income neighborhoods.

### *Selection of zip codes and blocks*

NYC zip codes were stratified into tertiles according to the percent of residents living below the federal poverty level. A sample size calculation was not possible because baseline proportions of alcohol advertisements in zip codes of different income levels were unknown. A sample size of 30 zip codes – ten from each income level (low, medium, and high) – was chosen as an achievable number of zip codes given time and staff restraints. After stratification into these three income levels, 10 zip codes were selected at random from each tertile (17% of 177 zip codes) (Table 1). The zip codes used were from 2006, and data on percent of residents living below the poverty level were taken from the 2000 Census.<sup>21</sup>

To identify highly commercial areas, Geographic Information Systems (GIS) software<sup>22</sup> was used to identify lots with retail area based on the 2009 MapPLUTO dataset from the NYC Department of City Planning. The dataset includes an estimate of the exterior dimensions of buildings in NYC that have been allocated for retail use.<sup>23</sup> Retail lots were then used to create a simple thematic map that had a darker color for those lots with any retail area. Retail-dense blocks were selected using the following criteria: 1) at least 50% of lots on the block include some retail area (not residential) on *both* sides of street, or 2) at least 75% of the lots include retail on one side of the street, or 3) if a block is on the border of a zip code, at least 50% of all lots include retail on the side within the zip code boundary. These retail-dense blocks were identified as commercial areas that may include alcohol advertisements. Among retail-dense areas where there were three or more contiguous retail-dense blocks, we sampled every third block for data collection on stationary alcohol advertisements. This extra selection criteria was established because we lacked sufficient resources to achieve full coverage. Thus we only

sampled one street segment (from cross-intersection to the next cross-intersection) from units of at least three continuous retail-dense block street segments. The number of blocks sampled in each zip code differed depending on the number of contiguous retail-dense blocks and the saturation of retail establishments in those areas. In less dense retail areas, it was not uncommon to encounter areas that, while appearing to have a lot of retail area, did not have as many street segments that met our sampling criteria. The selected segments were identified using the criteria above and always started with the selection process going in the same direction (from west to east) at the north end of the selected zip code area, moving in a southern direction and going back (east to west) down the next street segment. Finally, street segments were selected in a north – south direction and then a south – north direction. We attempted to minimize the variability in the selected segments by this uniform process. Ultimately, a total of 312 retail-dense blocks were selected for data collection across the 30 selected zip codes. From the zip codes sampled, areas with at least three contiguous retail-dense blocks ranged from approximately 0.35% to 41.44% of all blocks within zip codes, with a mean of 2.86% blocks per zip code. GIS was used to create maps for each zip code with sampled blocks highlighted for data collection purposes (Figure 1).

### *Data collection training*

The study coordinator helped create training materials and collected data, counting the above-ground, stationary alcohol ads in 24 of the 30 selected zip codes. Alcohol advertisements in the other six zip codes were counted by two Health Department staff members and 13 graduate-level public health students enrolled in a GIS for Public Health class at Hunter College during the Fall of 2010. The students, after receiving training and practicing with the data collection methods on their own, were placed into teams. These data collectors were provided training and resources, including a self-administered practice test, before they conducted their data collection in selected neighborhoods. Each team included one member responsible for navigating and selecting the appropriate street segments, with the other two entering the identified advertisements using the SMS service.

### *Classifying and documenting advertisements*

Only industry alcohol advertisements were counted. Non-industry advertisements are those created by the owner of the establishment, such as shown in Figure 2D, and were not counted. For each industry alcohol advertisement, alcohol type, brand, advertisement type, and address were documented and geocoded in real time using GeoChat,<sup>24</sup> an SMS text communications tool. GeoChat is a tool developed to allow users to see SMS messages on a map. The service provides a short code to which users can text up to 140 characters. Using a series of text delimiters, the message can be broken up into columns that later populate an aggregated dataset. Because the service also geocodes the text message when a street address is provided, data was downloaded following the field data collection and mapped using ArcGIS 9.3.1.

Alcohol type was classified as beer, wine, liquor/spirits, malt liquor, wine cooler, or “alcopops” (flavored malt beverages). There were five types of advertisement categories: 1) indoor, 2) billboard, 3) bus shelter, 4) outdoor, or 5) ambient. Indoor ads included any alcohol ad, such as posters or neon signage, located on the inside of a retail window and visible to a pedestrian on the street. Billboards are large ads placed far above the ground and visible to pedestrians and drivers. Bus shelters ads are those located on the side of shelters located at bus stops, visible to pedestrians and some drivers. All other ads were categorized as outdoor (phone booth, subway entrance, side of building, outside storefront, umbrella) or ambient, a category reserved for nontraditional ads, such as beverage coasters on outdoor furniture, flags, or electronic ads. Bus shelters are maintained by a private entity that contracts for and places the ads.

Every distinct advertisement was documented in a separate text communication to the project’s GeoChat account. A typical SMS text from the data collection team might look like the following: 100 Worth Street \* indoor \* beer \* [beer brand name].

All counts were completed during a single advertisement cycle from November 17, 2010 through December 4, 2010, because some outdoor ads in NYC have been previously reported to change on the first Monday of every month.<sup>25</sup>

### *Analysis*

Descriptive analyses of the alcohol advertisement data were performed using ArcGIS 9.3.1 and Microsoft Excel 2003™. The numbers of alcohol ads overall and per sampled block were

calculated by alcohol type, advertisement type, and brand name with respect to zip code and neighborhood income level. Since the zip codes were randomly selected after stratification by income level, the numbers of total ads, ads by alcohol type, and ads by advertisement type were multiplied by the respective factor needed to scale up to 100% of zip codes for each income group and by three, the factor needed to scale up to the number of three contiguous retail-dense blocks that blocks were sampled from. Because the majority of ads documented during the exploratory alcohol ad count project were located in highly commercial areas, we believe that these results represent a good citywide estimate of above-ground, stationary alcohol advertisements.

Since zip codes were randomly selected after income-level stratification, the mean number of ads (including total alcohol ads, total ads per capita, total ads per unique address, beer ads per block, wine ads per block, liquor ads per block, billboards per block, bus shelter ads per block, indoor ads per block, outdoor ads per block, ambient ads per block, and alcohol ads per block with at least one ad) were compared across the three income level categories to determine whether there was a statistically significant difference by neighborhood income level. Blocks with at least one alcohol ad were normally distributed across all three income levels, allowing the analysis of variance (ANOVA) test to be utilized. All other comparisons across three income groups required the nonparametric Kruskal-Wallis test since all three income groups in these categories were not normally distributed. There were two instances, total ads per unique address and total ads per block, in which the low and medium income level data were distributed normally and thus *t*-tests were used to compare the two income levels. In addition, brands identified in ten or more ads were compared to see if these more prominent brands differed across income levels. All statistical tests were performed using SAS 9.2, and significance levels were set at  $\alpha < 0.05$ .<sup>26</sup>

## Results

Of the 30 sampled zip codes, 27 (90%) had alcohol advertisements on at least one of the retail-dense blocks sampled. Of the 312 blocks sampled, 122 (39%) had at least one alcohol ad. A total of 581 above-ground, stationary alcohol advertisements were identified, resulting in 1.86 ads per

retail-dense block sampled. The observed ads were displayed at 181 unique addresses, resulting in an average of 3.1 ads per unique address (range 1–34, mode =1, median=2).

Of the 581 ads, 452 (78%) were for beer, 105 (18%) for liquor, 20 (3%) for wine, three (0.5%) for alcopop, and one (0.2%) for malt liquor. There were no wine cooler advertisements in the sampled areas. By advertisement type, there were 373 (64%) indoor, 131 (23%) outdoor, 70 (12%) ambient, six (1%) bus shelter, and one (0.2%) billboard.

Based on the sampled blocks, there were an estimated 10,515 above-ground, stationary alcohol advertisements in the most retail-dense areas of NYC. By alcohol type, there were an estimated 8,240 beer, 1,827 liquor, 383 wine, 49 alcopop, 16 malt liquor, and 0 wine cooler advertisements. By advertisement type, there were 6,727 indoor, 2,374 outdoor, 1,287 ambient, 111 bus shelter, and 16 billboard ads. Proportions of ads by alcohol type and advertisement type are displayed in Figure 3.

There were no significant differences by neighborhood income level in total advertisements, total ads per capita, total ads per unique address, individual alcohol types per block, individual ad types per block, ads per street sampled with at least one ad, and all brands with more than ten total ads.

## **Discussion**

Alcohol advertising is common in the most retail-dense areas of NYC. We found that the majority of above-ground, stationary alcohol ads in NYC are located inside retail spaces (both posters and neon signs) and mainly advertise beer and, to a lesser extent, liquor. We failed to find any significant differences in frequency of alcohol advertisements by income group when comparing advertisements by alcohol type, advertisement type, and popular brand name.

The presence of advertisements in retail-dense areas heavily frequented by local residents, including youth, may increase exposure of adolescents to alcohol advertising. Although alcohol industry trade groups have established voluntary standards for alcohol advertising to reduce youth exposure, billboards were not prevalent in the urban areas sampled and instead other types

of ads such as indoor ads were more prevalent. Thus, these standards may not maximize the intended effect as advertisements may still be highly visible to underage populations. For example, ads that are placed inside alcohol outlets (i.e., bars, liquor stores), where only legal-aged individuals can enter, are still visible at the street level to minors for whom they are not intended. There is no requirement that limits owners of stores that sell any type of alcohol for where they can place advertisements for their merchandise. Finally, given the prevalence of alcohol advertising and problem drinking among adults, research is needed on the impact of street-level advertising on adults drinking patterns.<sup>27</sup>

*Study strengths and limitations:*

To our knowledge, this is the first study to produce citywide estimates of above-ground, stationary alcohol advertisements. This study employed random selection of zip codes and retail-dense blocks for sampling, so we believe that the results are generalizable to all retail-dense areas. The unique use of GIS to identify retail-dense areas and create sampling maps can be replicated for studies in other jurisdictions or other public health efforts, as can the use of the relatively new GeoChat text messaging communications tool for data collection and aggregation. Training on the SMS messaging system was relatively intuitive for volunteer data collectors as most already understood the basics of text messaging. Therefore GeoChat provided an easy way to deploy a large number of volunteers across a number of different locations. Volunteers could later see the results that they and the other teams collected and use the aggregated results to troubleshoot any differences in interpretation of ad type. During the data collection process, the developers of GeoChat added the ability to extract the original address entered in the text message, therefore providing a way to later clean and update any information that was geocoded in the wrong location.

We chose to limit our sample to retail-dense areas of NYC with three or more continuous retail-dense blocks based on the exploratory alcohol advertisement count that demonstrated that virtually all alcohol advertisements were in the commercial arteries of sampled neighborhoods. Thus, it is likely this contributed to an underestimate of the number of billboards, which are usually placed in more visible, less retail-dense areas without visual obstruction. We also limited reporting to the sampled block and immediate surrounding area. Therefore, if a billboard could

be seen but was clearly in an unsampled street segment, it was not reported. Another limitation of our sampling scheme is that some commercial areas in some zip codes have retail areas mixed in with residential lots, which would not have met our sampling criteria. Thus, our sampling scheme may have been too rigorous for some zip codes. The percent of all NYC streets that the sampled retail-dense blocks comprised varied by zip code area and was, by far, highest in zip codes within lower Manhattan, which is a highly commercial area.

Our data did not identify statistically significant differences in alcohol advertising by neighborhood income level. While it is possible that there is no difference in number of advertisements by income level, our methods may have made it difficult to find differences that do exist. As mentioned previously, the strict sampling criteria's failure to identify commercial areas with a higher proportion of residential lots may also have been a limiting factor if commercial areas not identified were disproportionately in lower income neighborhoods. Furthermore, the likelihood that different modes of transportation (foot or public transit vs. car) may change the impact of advertisement placement in certain neighborhoods should also be considered. Future efforts should sample all NYC zip codes to enable the generation of borough-level estimates.

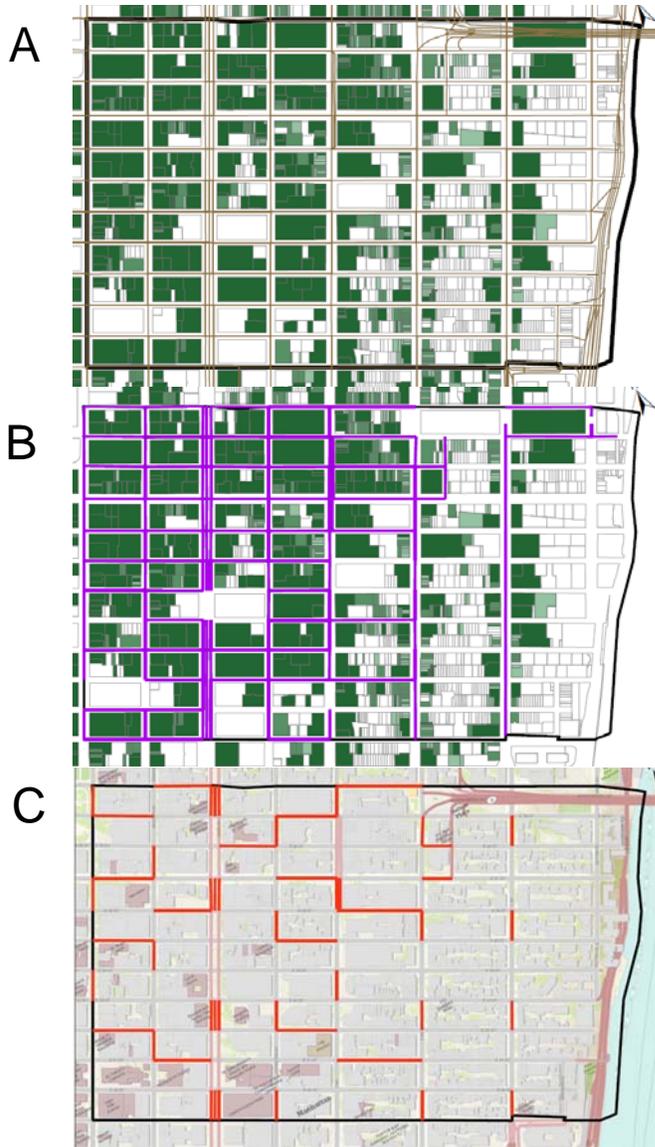
Although we provided the same training to all data collectors, we did not measure the degree of agreement, or inter-rater reliability, among data collectors. However, we attempted to minimize this limitation through providing data collection training and cell phone access to the study supervisors in case questions arose during data collection. This cross-sectional study was conducted during one ad cycle, which minimized possibility of ads changing during the period, but our results are still vulnerable to the possible effects of seasonality or concurrent events. For example, during the summer of 2010 when the exploratory ad count was conducted, there were many alcohol ads cross-promoting the World Cup. The methodology employed was unique, and it is critical that future work also account for estimation of error. This could be achieved with the addition of a quality control step, whereby a second team either cross-samples some street segments of other teams or a small subset of the assigned street segments for all teams, which would help identify reporting differences and reliability of various teams. Furthermore, with a larger group of volunteers it would be possible to have semi-regular sampling of neighborhoods over a longer period of time. It is reasonable to assume that static advertisements, like those in

stores or bars, are unlikely to change greatly from month to month, whereby advertising on bus stops or billboards may be more fluid or event-based (e.g., concerts, World Cup).

Finally, this study underestimates the true exposure to alcohol advertising that a NYC resident might have during the day, or account for advertisements that could be more or less visible at night (neon signs vs. unlit posters in windows). We did not document non-industry, mobile (i.e., those on taxi cabs, buses, or trucks), underground (i.e., those in the subway), or media (including television) ads. We also did not document alcohol containers displayed in liquor store windows as ads, although they add to the influence of alcohol in the environment without being a traditional advertisement (Figure 2). It is important to note the types of ads that were not documented since they add to the advertising that individuals may be exposed to and some forms may be associated with increased consumption. For example, television beer ads have been associated with an increased risk of beer consumption in exposed adolescents.<sup>28</sup> Another study demonstrated activation of positive alcohol expectations and association with higher expected drinking in third grade and older youth exposed to alcohol television ads as compared with their randomly assigned control peers who were shown soft drink commercials.<sup>29</sup> NYC is only one of two large US cities that allow alcohol advertisements on its public transportation.<sup>30</sup> As the largest mass transit system in the US, millions of children and adults can be repeatedly exposed to alcohol ads both in the station and in the train. In fact, a convenience sample of 17 Manhattan subway stations showed that approximately one fourth to one third of subway ads promoted alcohol.<sup>31</sup> Given these limitations, our findings provide a conservative NYC estimate for both stationary, above-ground advertising and exposure to all forms of alcohol marketing, including mobile and underground.

### **Acknowledgements**

We are grateful to Maria Nunez for piloting this project during summer 2010 in her role as Alcohol Policy Analyst (NYC DOHMH) at that time. Special thanks to the CUNY School of Public Health at Hunter College, GIS in Public Health class (Fall 2010): Niloufar Afshar, Terysia Herbert, Stephanie Herman, Jeremiah Huston, Natasha Itwaru, Joseph Kennedy, Zoey Laskaris, Emily Metzner, Mubashir Mohi-Ud-Din, Megan Reed, Evan Rousseau, Chris Tabellario, Hugaisa Villanueva.



**Figure 1. Example of selection of retail-dense areas and blocks in zip code 10022 (Gramercy Park – Murray Hill).** Image A displays the retail lots in green and all streets in brown. Image B shows all retail-dense blocks identified using established criteria (see Methods). Image C shows the selected retail-dense blocks for sampling. Blocks selected were every third block of retail-dense areas in which at least 3 continuous blocks were retail-dense.

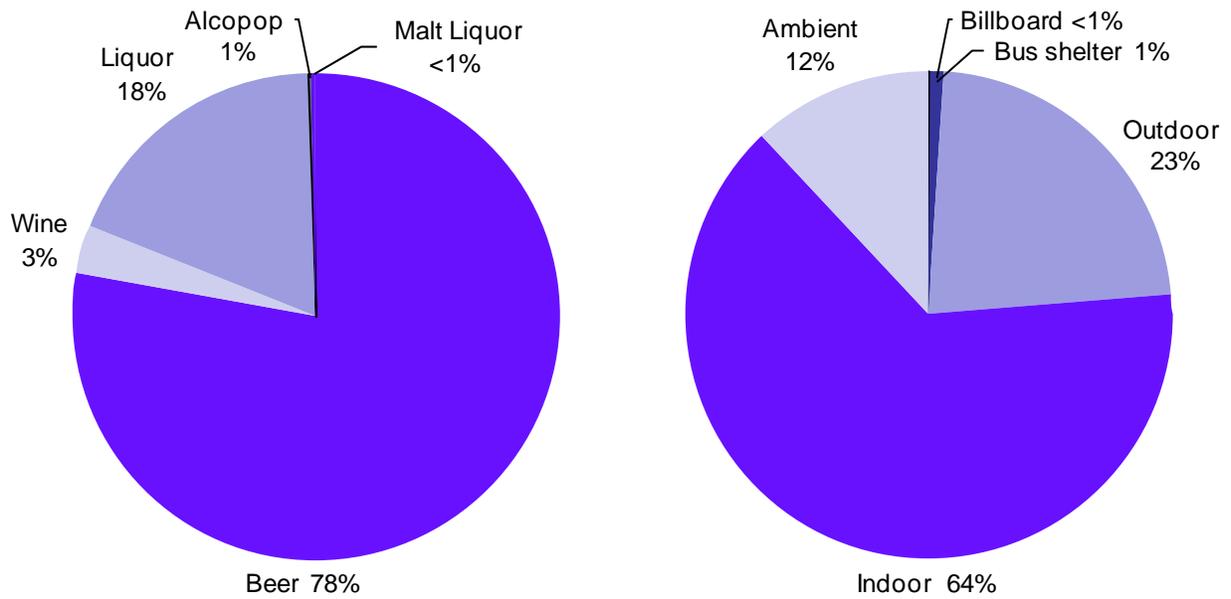


**Figure 2. Examples of alcohol exposures excluded from this study**

The following are examples of alcohol advertisements and exposures that were not counted since they were not stationary, above-ground, alcohol advertisements, nor by the alcohol industry respectively: A) Mobile advertisements such as those on buses, taxis, trucks; B) Underground ads in the subway system; C) Actual bottles on display; and D) local ads by the store.

**Table 1. Neighborhood and geographic characteristics of sampled zip codes**

	Zip codes (2006)	Number of sampled zip codes	% sampled of all zip codes in given area
NYC overall	(n=177)	(n=30)	16.9%
Neighborhood income level			
Low-income neighborhoods	54	10	18.5%
Medium-income neighborhoods	54	10	18.5%
High-income neighborhoods	69	10	14.5%
Borough			
Bronx	26	4	15.4%
Brooklyn	38	6	15.8%
Manhattan	41	5	12.2%
Queens	60	12	20.0%
Staten Island	12	3	25.0%



**Figure 3. NYC alcohol advertisement proportions in retail-dense areas by alcohol type and ad type.**

Note: Sampled retail-dense areas had no wine cooler advertisements for this study, so citywide estimates for wine cooler ads are not provided.

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