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Assessment of the Average Price and Ethanol Content of Alcoholic Beverages by Brand – United States, 2011

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Abstract

Background—There are no existing data on alcoholic beverage prices and ethanol content at the level of alcohol brand. A comprehensive understanding of alcohol prices and ethanol content at the brand level is essential for the development of effective public policy to reduce alcohol use among underage youth. The purpose of this study was to comprehensively assess alcoholic beverage prices and ethanol content at the brand level.

Methods—Using online alcohol price data from 15 control states and 164 online alcohol stores, we estimated the average alcohol price and percentage alcohol by volume for 900 brands of alcohol, across 17 different alcoholic beverage types, in the United States in 2011.

Results—There is considerable variation in both brand-specific alcohol prices and ethanol content within most alcoholic beverage types. For many types of alcohol, the within-category variation between brands exceeds the variation in average price and ethanol content among the several alcoholic beverage types. Despite differences in average prices between alcoholic beverage types, in 12 of the 16 alcoholic beverage types, customers can purchase at least one brand of alcohol that is under one dollar per ounce of ethanol.

Conclusions—Relying on data or assumptions about alcohol prices and ethanol content at the level of alcoholic beverage type is insufficient for understanding and influencing youth drinking behavior. Surveillance of alcohol prices and ethanol content at the brand level should become a standard part of alcohol research.

Keywords

Alcohol content; Alcohol prices; Alcoholic Beverage Type; Youth

INTRODUCTION

Alcohol use among underage youth is a continuing public health problem in the United States (Hingson and Kenkel, 2004), causing an estimated 4,600 deaths annually (Centers for Disease Control and Prevention, 2011). Understanding the factors that influence youth drinking is essential for the development of effective interventions to reduce underage alcohol use and its associated consequences. Two of the factors that have been shown to

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affect youth alcohol consumption are the price and ethanol content of alcoholic beverages. Numerous studies have demonstrated that alcohol prices are inversely correlated with alcohol consumption (Wagenaar et al., 2009, 2010) and that increased prices lead to reductions in both frequency of drinking and prevalence of heavy drinking among youth (Chaloupka et al., 2002; Grossman et al., 1994; Wagenaar et al., 2009). Ethanol content influences youth drinking in three ways. First, several studies demonstrate that preferences for types of alcoholic beverages with differing levels of alcohol are associated with different drinking patterns (Berger and Snortum, 1985; Clapp and Shillington, 2001; Gmel et al., 1999; Gronbaek et al., 1999, 2004; Hughes et al., 1997; Jensen et al., 2002; Klatsky et al., 1990; Klein and Pittman, 1990; Kuntsche, 2001; Kuntsche et al., 2006; Naimi et al., 2007; Pedersen et al., 2010; Rogers and Greenfield, 1999; Smart, 1996; Smart and Walsh, 1995; Snortum et al., 1987; Wicki et al., 2006). Second, ethanol content influences retail prices and packaging and therefore how much alcohol a youth with limited funds can purchase (Jones and Gregory, 2009). Third, ethanol content also affects price whenever states tax beverages within the same category differently based on ethanol content.

Existing data on both alcoholic beverage prices and ethanol content are available almost exclusively at the level of alcoholic beverage type (i.e., beer, spirits, wine, etc.). Alcohol price data from the American Chamber of Commerce Researchers Association (ACCRA) include values for beer, spirits, and wine, based on price data for only one brand in each type (Manning et al., 1994; Trolldal and Ponicki, 2005; Young and Bielinska-Kwapisz, 2003). In addition, these data are based on convenience samples, and ACCRA has not collected data on all three types of alcoholic beverages for several years. There is, at present, no suitable alcohol price database at the brand level for use across the U.S.

Some previous research has assessed price differences at the level of alcoholic beverage type (Gruenewald et al., 2006; Stockwell et al., 2006; Treno et al., 1993, 2006). Similarly, almost all existing data on differences in ethanol content between beverages compare alcoholic beverage types. For example, Kerr et al. (2005, 2006) have reported differences in ethanol content between beer, spirits, and wine using a U.S. sample.

However, youths may choose alcoholic beverages based not only on type and alcohol content, but on brand (Saffer, 2002): alcohol is advertised at the brand level, and differences in brand capital may influence alcohol-purchasing behavior (Saffer, 2002). Because of the huge number of alcohol brands in each type, there may be wide variations in both prices and ethanol content within a single alcoholic beverage type, and it can be hypothesized that this within-type variation could approach or even exceed the level of variation found between alcoholic beverage types.

A comprehensive understanding of alcohol prices and ethanol content at the brand level is essential for the development of rational public policy. For example, several state Attorneys General have called for the removal of Colt 45 Blast – a flavored malt beverage, sold in 23-ounce cans, with 12% alcohol content by volume – from the market due to its high alcohol content (WBZ Boston, 2011). However, there has been no systematic research on the alcohol content of all brands in this category to determine whether Colt 45 Blast is in a class by itself and deserves to be singled out, or whether there may actually be many flavored alcoholic beverages on the market with higher alcohol content. As policy decisions are being made at the brand level, it is essential to have comprehensive price and alcohol content information at the brand level as well, in addition to brand-specific consumption information.

A major reason why brand-specific alcohol price data are so important is that they might inform the development and assessment of minimum alcohol price policies, which are

thought to influence the entry point for alcohol use among youth (Donaldson & Rutter, 2011; Groves, 2010). Several studies suggest that increases in minimum prices have large effects on alcohol sales, and therefore probably on alcohol use as well, which could have particularly profound implications for reducing alcohol use and its adverse consequences among youth (Black et al., 2011; Meier et al., 2009; Purshouse et al., 2010).

The lack of information on brand-specific prices and ethanol content is a glaring hole in the current literature. To the best of our knowledge, there has been no published, systematic study of alcohol price and ethanol content data at the brand level. We are aware of only one study that has reported brand-specific alcohol price and content data, but that was only for a single beverage type: Jones and Barrie (2011) recently determined the price and alcohol content of each brand of ready-to-drink alcoholic beverages at 52 retail outlets in New South Wales.

The development of a comprehensive database of alcohol prices and content by brand would make several additional contributions to the literature and help advance alcohol research significantly. First, it would enable researchers to examine the effect of brand-specific prices on youth alcohol brand preferences. Second, by examining the relationship between the brands consumed and the price per unit of alcohol for each brand, this information would allow researchers to test directly the hypothesis that youth who drink maximize the amount of alcohol content per dollar spent. Third, it would allow for studies of the effect of brand-specific alcohol marketing on youth alcohol consumption to control for brand-specific price differences, something that is not possible with existing data. Recently, we developed an internet-based survey instrument to measure alcohol brand preferences among youth (Siegel et al., 2011). Combining data on youth alcohol brand consumption with brand-specific alcohol price and ethanol content data would yield a powerful tool for better understanding influences on youth drinking behavior.

A final benefit of a comprehensive, brand-specific alcohol price database is the ability to better understand the effect of price changes on consumer behavior. It is not clear to what extent consumers respond to price increases by switching alcohol brands (Gruenewald et al., 2006; Ponicki et al., 1997). Gruenewald et al. (2006) found evidence that the effect of alcohol price increases is mitigated by significant brand substitution. Thus, it is not enough merely to study average alcohol prices within type categories—identifying brand-specific price differences is essential.

In this paper, we provide what we believe is the first comprehensive assessment of alcohol price and ethanol content differences by brand. Using online alcohol price data from 15 control states and 136 online alcohol stores in the United States, we estimate the average alcohol price and percentage alcohol by volume for 900 different brands of alcohol, across 17 different alcoholic beverage types. We also report for each brand the average price per unit volume of alcohol.

MATERIALS AND METHODS

Brand List

We compiled a list of alcohol brands for 17 different alcoholic beverage types using several data sources. First, we included all alcohol brands advertised in national issues of magazines or on national television (network or cable) during the years 2006 through 2010, based on data licensed from The Nielsen Company (New York, 2011).

Second, we included all alcohol brands cited by Impact Databank (New York, 2011) as the top 200 distilled spirit brands, top 50 beer brands, and top 10 flavored alcoholic beverage brands for in terms of overall 2009 U.S. market share.

Third, because most brands of alcoholic energy drinks were new in the marketplace and not included in the Impact Databank list, we drew on an extensive list compiled by the National Association of Attorneys General as part of an ongoing investigation into the marketing of these beverages.

Finally, we included all alcohol brands reported by participants in our two preliminary pilot studies of youth alcohol brand preference (Siegel et al., 2011a, 2011b).

Our final brand list consisted of the following number of brands in each of these categories, with a total of 900 alcohol brands: beer (132), flavored alcoholic beverages (62), alcoholic energy drinks (11), brandy (15), cognac (9), gin (27), rum (54), tequila (33), bourbon (23), scotch (25), vodka (86), whiskey (29), cordials/liqueurs (77), low-end fortified wine (5), table wine (306), grain alcohol (5), and alcoholic whipped cream (2).

Control State Price Databases

In 15 of the 18 control states (Alabama, Idaho, Iowa, Maine, Michigan, Montana, New Hampshire, North Carolina, Ohio, Oregon, Pennsylvania, Utah, Vermont, Virginia, and Washington), we were able to identify an online price database that specified a uniform price for certain alcohol products sold in the state.

Online Alcohol Stores

We identified a set of online alcohol stores that either list prices for all of their alcohol brands or have a searchable database with online price information. We located these stores through several mechanisms, including internet searches for popular online alcohol stores, lists of online alcohol stores registered in control states, and internet searches for specific alcohol brands.

A total of 136 online alcohol stores were distributed by state as follows: Arizona (1), Arkansas (1), California (25), Colorado (6), Connecticut (5), Delaware (1), District of Columbia (1), Florida (5), Georgia (2), Hawaii (1), Idaho (1), Illinois (9), Indiana (2), Iowa (1), Kentucky (2), Louisiana (1), Massachusetts (7), Michigan (1), Minnesota (5), Missouri (1), New Jersey (27), New York (17), Ohio (1), Pennsylvania (2), South Carolina (1), Texas (6), Virginia (1), and Washington (2).

It should be noted that the primary advantage of online stores is that buyers can easily purchase in bulk and therefore attain substantial price savings. Most users of these online sites, therefore, tend to be adults who are buying regularly or buying in bulk.

Pricing Procedure

We first priced out all of the brands sold in each control state using the online price databases. All 15 control states listed pricing for liquor brands (vodka, rum, tequila, grain alcohol, etc.); one control state (Utah) reported pricing for beer; four control states (New Hampshire, Pennsylvania, Utah, and Washington) provided information for table wine; and 14 (all except Ohio) listed pricing for flavored alcoholic beverages.

We next priced out the brands using information posted at online stores. We visited additional stores and continued pricing out all of the brands within an alcoholic beverage type until we had price information for every brand in at least three different stores or had visited all of the identified online stores. We modified this procedure slightly for table wines

due to the large number of brands: after examining the prices listed at the four control state sites, we priced out all listed brands at seven additional online stores, for a total of 11 sites; then, when visiting additional online stores, we priced out only those brands for which we did not yet have three price points.

The total number of sites at which we priced out all of the listed brands for each alcoholic beverage category are as follows: beer (52), flavored alcoholic beverages (35), alcoholic energy drinks (49), brandy (21), cognac (16), gin (24), rum (33), tequila (32), bourbon (15), scotch (15), vodka (37), whiskey (21), cordials/liqueurs (36), low-end fortified wine (22), table wine (11), grain alcohol (27), and alcoholic whipped cream (23). Because some stores did not carry particular brands, we do not have a price for every brand at every store.

We collected the pricing information during 2011, using the most recent prices listed for that year. We recorded the posted retail prices found at each store, including sale prices but excluding pricing for kegs, high-volume discounts for multiple bottles of spirits and wine, and one-time close-out offers. We included alcohol excise taxes in the prices but not state or local sales taxes, which are not applied to alcohol exclusively.

At each store, we priced a brand by identifying the cheapest item in the brand category, taking into account the volume size of the beverage and the percentage of alcohol by volume. For example, if a store were offering Corona Extra at $10.00 for a six-pack and $18.00 for a twelve-pack, then we would price out the twelve-pack since it is available at a cheaper price per unit volume. As another example, when pricing out Bacardi Rum, if a store was offering Bacardi Silver Rum at $15.99 for 750 mL and Bacardi Gold Rum at $17.99 for the same volume, then we would price out the Bacardi Silver Rum.

We defined table wine brands by the brand name, not considering the specific vintage, grape variety, or lower-level classification. Thus, for example, all table wines with the name “Sutter Home” were considered to be part of the same brand family. As per the protocol, for a given store, we priced out the least expensive table wine within this brand family.

For each brand priced at a given store, we recorded the specific brand name, total volume, price, and percent alcohol by volume. We obtained information on ethanol content from one of several sources. For most stores, the item description included the ethanol content. If not, then we obtained that information from control state web sites, online alcohol stores, or if not available elsewhere, through internet searches.

It is important to note that all prices were for off-premises retailers and do not reflect the prices that customers would pay for alcoholic beverages at a bar, tavern, or restaurant.

Pricing Measures

Price Per Unit Alcohol—At each store, we calculated the price per unit alcohol for each available brand by multiplying the beverage’s total volume by the percentage alcohol by volume and then dividing that figure into the beverage’s retail price. Price per unit alcohol was expressed as the price per ounce of alcohol.

Average Price Per Unit Alcohol and Average Ethanol Content—We calculated the average price per unit alcohol and the average ethanol content for each brand by determining the mean of these data for each brand across all stores at which that brand was available.

Weighting Procedure

Our sample of stores provided substantial geographic coverage of the U.S., but the number of youth living in each state—and therefore subject to the alcohol prices in that state’s stores

—varied widely. We began by calculating average price estimates that weighted each price point equally, no matter in what states the stores were located. Next, in order to derive average price estimates that took into account the number of youth actually subjected to various prices, we weighted each obtained price by the number of underage youth, ages 15-20, living in the state in which the store was located. These weighted price estimates provide a better approximation of the average price most likely to be experienced by youth nationally.

Data Compilation and Analysis

We entered the data into an Excel spreadsheet and then exported it into a Microsoft SQL*SERVER 2008 Release 2 database (Microsoft Corporation, Redmond, WA).

Inter-rater Reliability

To check the degree of inter-rater reliability in pricing, two members of the research team independently priced out beer brands at the same test store web site. We chose beer as the test category since it typically had the greatest pricing variability. We determined concordance between the two price assessors by using Cronbach's alpha for the percentage of exact matches and Pearson's correlation coefficient for the relationship between the prices per unit volume of alcohol that they calculated.

RESULTS

Inter-rater Reliability

Two price assessors priced out the same 97 beer brands from the test store web site. Looking at the percentage of exact matches, the Cronbach's alpha coefficient was 0.96. The Pearson correlation coefficient between the brand-specific prices per ounce of alcohol recorded by the two raters was 0.92. The average percentage difference between the two raters' brand-specific prices per unit of alcohol was 0.3%.

Comparison of Weighted and Unweighted Price Averages

There were only minor differences between the unweighted and weighted average prices of the 900 alcohol brands. The Pearson correlation coefficient for the weighted and unweighted prices was 0.96 ($p<0.0001$), indicating that state-level variation in alcohol brand prices between small and large states did not have a substantial effect on relationships among the brand-specific price estimates. Accordingly, we present only unweighted prices in this manuscript; our supplemental online database provides both the unweighted and weighted price averages (http://www.youthalcoholbrands.com/price.html).

Average Number of Pricings Per Brand

In all, there were 11,875 pricings of the 900 alcohol brands in our database, yielding an average of 13.2 pricings (stores) per brand. Of the 900 brands, 229 (25.4%) were successfully priced out at 20 or more stores, 445 (49.4%) were priced out at 10 or more stores, 702 (78.0%) were priced out at five or more stores, and 865 (96.1%) were priced at three or more stores.

Variability in Individual Prices

We calculated the coefficient of variation for each brand's average price estimate (the standard deviation divided by the mean) in order to assess the magnitude of inter-store variability in relation to the average price point. For 473 (52.6%) of the 900 brands, the coefficient of variation was 20% or less, and for 711 (79.0%) of the 900 brands, the coefficient of variation was 30% or less.

Differences in Alcohol Excise Tax Rates Between Represented and Unrepresented States

The database includes pricing data from a total of 36 states, including the District of Columbia, with 15 states not represented. We used data from the Tax Foundation (2011a, 2011b, 2011c) to examine differences in the alcohol excise tax rates between the represented and unrepresented states to see whether our national average price estimates might have been affected by not having data from every jurisdiction.

For distilled spirits, the mean excise tax in represented states was $7.27 per gallon, with a median of $5.36, compared to a mean of $4.22 and a median of $3.75 in unrepresented states. For beer, the mean excise tax in represented states was $0.30 per gallon, with a median of $0.20, compared to a mean of $0.27 and a median of $0.18 in unrepresented states. For table wine, the mean excise tax in represented states was $0.73 per gallon, with a median of $0.58, compared to a mean of $0.82 and a median of $0.70 in unrepresented states. Therefore, it appears that our data might somewhat overestimate average distilled spirits prices nationally and slightly underestimate average table wine prices, with no bias present for average beer prices. It is important to note, however, that relative pricing within an alcoholic beverage category would not be affected.

Mean and Variability in Average Brand-specific Alcohol Price and Ethanol Content by Alcoholic Beverage Type

Table 1 displays the average price per ounce of alcohol and the average percentage alcohol by volume for each alcoholic beverage type. This table makes evident the great range in price within each category. For example, beer ranges in price from 73 cents to more than four dollars per ounce of alcohol. For table wine, the minimum price per ounce of alcohol is just 70 cents, while the maximum price is over 86 dollars per ounce. Importantly, customers can purchase at least one brand of alcohol that is under one dollar per ounce of ethanol in 12 of the 16 drinkable alcoholic beverage categories (beer, flavored alcoholic beverages, bourbon, brandy, gin, rum, scotch, vodka, whiskey, low-end fortified wine, table wine, and grain alcohol). As a result of this variability, there is tremendous overlap in price between the categories.

There is also wide variability in ethanol content within the alcohol beverage categories. For example, beer ranges from 2.9% alcohol by volume to 8.5%, flavored alcoholic beverages range from 4.0% to 40.0%, and pre-mixed caffeinated alcoholic beverages range from 20.0% to 40.0%. Even the traditional spirits categories show considerable variation in alcohol content. For example, cordials and liqueurs range from 15.0% alcohol by volume to 69.0%, and rum ranges from 18.0% to 51.8%. As with price, there is considerable overlap in alcohol content between the categories. For example, while rum generally contains more alcohol by volume than table wine, the table wine brand with the highest alcohol by volume has a greater alcohol content than the rum brand with the lowest alcohol content. Similarly, while beer is generally lower in alcohol than table wine, several beer brands have alcohol content exceeding that of the table wine brands with the lowest alcohol content.

Brands with Highest and Lowest Average Price and Alcohol Content, by Alcoholic Beverage Type

For each alcoholic beverage type, Table 2 presents the three cheapest and three most expensive brands in terms of price per ounce of alcohol, as well as the three highest and three lowest brands in terms of alcohol percent by volume. The most striking discovery from this table is that within almost every alcoholic beverage type, there are several very cheap brands available. For 12 of the 17 alcoholic beverage categories, the three cheapest brands cost less than one dollar per ounce of alcohol.

Even in categories with a relatively low average alcohol content, there are brands available that have rather high alcohol content. For example, while flavored alcoholic beverages as a whole have an average alcohol by volume of 13.0%, the top three brands in terms of ethanol content contain between 37.5% and 40.0% alcohol by volume. Similarly, while cordials/liqueurs average only 29.5% alcohol by volume, the top three brands in terms of ethanol content contain between 50.0% and 69.0% alcohol by volume.

In several cases, the brand with the highest alcohol percent by volume is also one of the cheapest. For example, Potter's Long Island Iced Tea, a flavored alcoholic beverage, can be purchased for a mere $0.69 per ounce of alcohol and is 40% alcohol by volume. The same holds true for Mr. Boston Vodka and Night Train (a low-end fortified wine).

The Top 25 Cheapest Brands of Alcohol

Table 3 presents the 25 alcohol brands with the lowest prices per ounce of alcohol, with the alcoholic beverage type and percent alcohol by volume noted for each. The four least expensive brands, in order, are McCalls's (vodka), Zelko (vodka), Tilt (flavored alcoholic beverage), and Gem Clear (grain alcohol). These brands vary widely in alcohol content, from 95% for Gem Clear to 12% for Tilt. The cheapest alcohol brands are dominated by spirits, including gin, vodka, rum, whiskey, and grain alcohol.

The Top 25 Flavored Alcoholic Beverage and Low-end Fortified Wine Brands in Terms of Highest Average Percentage Alcohol by Volume

Table 4 specifically examines flavored alcoholic beverages and low-end fortified wines, alcoholic beverage types that are thought to appeal specifically to underage youths for their sweet taste, which may mask high alcohol content. The top six brands on this list are flavored alcoholic beverages that possess an average alcohol by volume of at least 20%. Combining these two categories, there are 25 separate brands with an alcohol content of 13% or higher.

A complete database, including the average price and alcohol content of each of the 900 brands, is available at: http://www.youthalcoholbrands.com/price.html.[1]

DISCUSSION

To the best of our knowledge, the present study presents the most comprehensive database available in the U.S. with brand-level information on ethanol content and prices of commercially available alcoholic beverages. We found that there is tremendous brand-level variation in both ethanol content and average price per ounce of alcohol within each alcoholic beverage category. In many cases, the between-brand variation within a given category far exceeds the variation found when examining average prices and ethanol content by alcoholic beverage type.

This new finding has important implications for alcohol research, public health practice, and federal, state, and local policy. Clearly, it is insufficient to rely on data reported at the level of alcoholic beverage type rather than brand. Generally, beer is viewed to be cheaper than table wine, yet, at the brand level, we identified beer brands that cost nearly 15 dollars per ounce of alcohol and table wines that cost only 50 cents per ounce of alcohol. Similarly, flavored alcoholic beverages are often assumed to be low-alcohol drinks, designed specifically to appeal to young people, especially girls (Mosher and Johnsson, 2005),

[1]We will gladly make these data available publicly at this web site upon publication of the paper. We have submitted the database as a separate document with the manuscript submission.

whereas spirits such as rum are typically viewed as having a higher alcohol content. However, we identified four flavored alcoholic beverage brands with an alcohol percentage by volume of greater than 37% and three brands of rum with an alcohol content below 22%.

Thus, to the extent that data on type-specific differences in alcohol prices or content have been used to develop public health policy, our research suggests the need to re-examine these policies using data the brand level. Consider the fact that several states recently banned the sale of certain alcoholic energy drinks after highly publicized episodes of underage youth being hospitalized after drinking Four Loko (Cleary et al., 2011). Our research reveals that there are several alcoholic energy drinks with much higher alcohol content than Four Loko, yet they were not removed from the market under those state-level bans because they are defined primarily as spirits rather than as beer or malt liquor beverages (Winter, 2010). One alcoholic energy drink brand that we identified – Belvedere IX vodka, which contains guarana and ginseng – has an alcohol content of 42.3%, compared to just 12% for the far more controversial Four Loko. Other brands of alcoholic energy drinks in the spirits category include V2 Vodka, Vicious Vodka, XZO Vodka, 3 A.M. Vodka, P.I.N.K. spirits, and Agwa de Bolivia herbal liqueur.

In early 2011, several state Attorneys General called for the removal of Colt 45 Blast from the market because of its high alcohol content (WBZ Boston, 2011). We found, however, that Potter's Long Island Iced Tea, sold in a similarly sized container, has an alcohol content of 40%, almost three and a half times that of Blast, and is sold at a price of just 69 cents per ounce of alcohol, five cents per ounce cheaper than Blast. Overall, we identified 30 flavored alcoholic beverage brands and five fortified wine brands that have an alcohol content greater than Blast's. Data such as ours, which reveals the brand-specific price per ounce of alcohol and the average percentage alcohol by volume, should be used by policymakers to make informed decisions when considering a ban or otherwise regulating certain alcoholic beverages.

A second important finding is the large number of inexpensive alcohol brands that are available, often with very high alcohol content, in almost every one of the alcoholic beverage categories. As a result, policies designed to discourage consumption by regulating prices at the level of alcohol type (Muller et al., 2010) may be ineffective: because there are inexpensive options in almost all alcoholic beverage type categories, taxing one particular category more heavily will likely lead to substitution of brands from other categories, rather than to a reduction in overall alcohol consumption (Gruenewald et al., 2006; Muller et al., 2010). To be effective, policies may need to be made at the brand level, with standards applied uniformly across all alcoholic beverage types. Taxes could be based on alcohol content, for example, so that the tax per ounce of ethanol is equalized across all alcohol brands and types.

There are several limitations to this research. First, because of the resource-intensive work involved in pricing out 900 brands, we were able to price out the brands at only a limited number of stores and could not price out every brand at every one of the 179 stores whose price lists we examined. We decided that it was more important to develop a comprehensive database that included all major brands than to obtain an extremely high level of precision for a smaller subset of brands. Second, we were unable to visit each store in person to confirm the listed prices and were therefore reliant upon the accuracy of the stores' web sites. We also were unable to confirm the timeliness of web site updates, so some price data might not reflect the most recent price changes. Third, we did not systematically sample stores within states. Some states were overrepresented and others were not included. Therefore, we cannot state that these data are fully representative of the nation as a whole. Finally, our pricing data include discounts for pre-packaged bulk purchases, such as a 12-

pack of beer, but did not include discounts for high-volume purchases of individual bottles of wine or spirits. Multi-unit discounts may not reflect the actual prices encountered by youth who are unable to afford bulk purchases.

While we did not systematically sample stores in all 50 states, these data generally do reflect alcohol pricing in the market and therefore can be used in future research on youth brand selection. First, we found that between-state variation in alcohol brand prices was relatively small. Substantially weighting prices in high-population states did not appreciably affect our average brand-specific price estimates. Second, given our focus on youth brand selection, we are most interested in the *relative prices* within brand categories. Any errors introduced by our pricing methodology are unlikely to produce the kind of systematic bias that would skew findings about the relationships between price, alcohol advertising exposure, and youth brand preference. Those errors would add noise to the system (i.e., variance), of course, but that would only serve to drive our results toward the null.

It is important to note the difficulty, if not logistical impossibility, of producing anything other than an approximation of relative brand prices. It takes a long time to assemble this data due to the large numbers of brands and the large number of outlets and internet sites that have to be searched. During that time period, the prices are subject to fluctuation, due to low-price promotions and changes in wholesale prices.

Despite these limitations, then, this research provides the first comprehensive assessment of alcohol prices and ethanol content at the brand level. The availability of these data will allow future research to examine multiple research questions that could not previously be explored, including the comparative roles of pricing and alcohol brand marketing in youth alcohol consumption and brand preference.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Means and Variability in Average Brand-specific Alcohol Price and Ethanol Content by Alcoholic Beverage Type

Alcoholic Beverage Type	Average Price per Ounce of Alcohol (SD)	Minimum Average Price	Maximum Average Price	Average Alcohol by Volume, % (SD)	Minimum Average ABV	Maximum Average ABV
Beer	$1.93 ($0.62)	$0.73	$4.19	5.1 (1.0)	2.9	8.5
Flavored alcoholic beverages	$2.14 ($1.01)	$0.52	$5.20	13.0 (7.7)	4.0	40.0
Alcoholic energy drinks	$3.05 ($1.03)	$1.97	$5.31	37.3 (6.9)	20.0	42.7
Bourbon	$1.60 ($0.78)	$0.70	$3.66	42.3 (3.8)	32.3	50.7
Brandy	$1.97 ($1.83)	$0.87	$6.47	37.5 (3.7)	28.0	40.0
Cognac	$3.81 ($2.12)	$2.47	$9.31	39.9 (0.5)	38.7	40.7
Cordials/Liqueurs	$3.13 ($1.81)	$1.06	$9.54	29.5 (12.1)	15.0	69.0
Gin	$1.26 ($0.80)	$0.53	$2.69	40.8 (3.1)	30.0	47.0
Rum	$1.66 ($0.97)	$0.59	$4.84	38.9 (5.5)	18.0	51.8
Scotch	$2.84 ($1.38)	$0.85	$5.03	41.0 (1.8)	38.3	46.0
Tequila	$5.18 ($6.00)	$1.20	$27.00	40.0 (0.0)	40.0	40.0
Vodka	$1.85 ($1.05)	$0.51	$5.36	39.8 (1.1)	35.0	44.3
Whiskey	$1.50 ($0.94)	$0.61	$4.51	40.5 (1.9)	39.4	50.0
Low-end fortified wine	$0.96 ($0.07)	$0.90	$1.04	15.5 (1.9)	13.1	17.5
Wine	$5.47 ($7.71)	$0.70	$86.18	13.3 (1.6)	6.0	20.0
Grain alcohol	$0.68 ($0.12)	$0.52	$0.82	91.1 (8.7)	75.5	95.0
Alcoholic whipped cream	$5.06 ($1.04)	$4.32	$5.79	16.6 (2.2)	15.0	18.1
TOTAL (all brands in database)	$3.36 ($5.01)	$0.51	$86.18	23.1 (15.4)	2.9	95.0

Notes: Average price per ounce of alcohol across each alcoholic beverage type represents the average of the mean price for each alcohol brand in that category. Average alcohol by volume across each alcoholic beverage type represents the average of the mean alcohol content for each alcohol brand in that category. Minimum and maximum prices are the lowest and highest brand-specific prices found at any store. Minimum and maximum alcohol content are the lowest and highest brand-specific alcohol content found at any store. ABV = percent alcohol by volume, SD = standard deviation.

Table 2

Brands with Highest and Lowest Average Price and Ethanol Content, By Alcoholic Beverage Type

Alcoholic Beverage Type	Three Cheapest and Three Most Expensive Brands in Terms of Average Price Per Ounce of Alcohol		Three Highest and Three Lowest Brands in Terms of Average Alcohol Percent by Volume (%)	
	Price	**Brand**	**ABV**	**Brand**
Beer	$0.73	Hurricane Malt Liquor	8.5	Red Bull Malt Liquor
	$0.74	Keystone Ice	8.2	St. Ides Malt Liquor
	$0.76	Steel Reserve Malt Liquor	7.9	Steel Reserve Malt Liquor
	$3.27	Abita Light	3.3	Heineken Light
	$3.76	Beck's Light	3.2	Santiago
	$4.19	Allagash	2.9	Beck's Light
Flavored alcoholic beverages	$0.52	Tilt	40.0	Potter's Long Island Iced Tea
	$0.55	Evil Eye	37.5	McCormick Long Island Iced Tea
	$0.68	Four MaXed	37.5	Desert Island Long Island Iced Tea
	$4.20	New Mix Margaritas	5.0	Jack Daniel's Cocktails
	$4.31	Skinnygirl Margaritas	5.0	Twisted Tea Hard Iced Teas
	$5.20	Cocktails by Jenn	4.0	Bartles & Jaymes Wine Coolers
Alcoholic energy drinks	$1.97	XZO Vodka	42.7	Belvedere IX Vodka
	$2.07	3AM Vodka	40.0	3 AM Vodka
	$2.35	Lotus Vodka	40.0	P.I.N.K. Spirits
	$3.49	Belvedere IX Vodka		
	$4.06	Agwa de Bolivia Herbal Liqueur	30.0	Agwa De Bolivia Herbal Liqueur
	$5.31	Everglo Vodka	20.0	Everglo Vodka
Bourbon	$0.70	Kentucky Gentleman	50.7	Knob Creek
	$0.75	Ten High	49.1	Wild Turkey
	$0.75	Kentucky Tavern	46.0	Ridgemont Reserve
	$2.54	Ridgemont Reserve	40.0	Many
	$2.67	Woodford Reserve	32.3	Firefly Bourbon
	$3.66	Basil Haydens		
Brandy	$0.87	Christian Brothers	40.0	Many
	$0.90	Banker's Club	33.8	Hiram Walker
	$0.90	E & J Gallo	33.0	Allen's
	$4.36	Domaine de Canton	28.0	Domaine de Canton
	$5.35	Cardenal Mendoza		
	$6.47	Manso & Contreras		
Cognac	$2.47	Courvoisier	40.7	A. De Fussigny
	$2.82	Jacques Cardin	40.0	Many
	$2.83	Hennessy	38.7	Alize Cognac

Alcoholic Beverage Type	Three Cheapest and Three Most Expensive Brands in Terms of Average Price Per Ounce of Alcohol		Three Highest and Three Lowest Brands in Terms of Average Alcohol Percent by Volume (%)	
	Price	**Brand**	**ABV**	**Brand**
	$3.61	B & B		
	$3.96	Martell		
	$9.31	A. De Fussigny		
Cordials/Liqueurs	$1.06	Jenkins Cordials	69.0	Grand Absente Liqueur
	$1.15	Jeremiah Weed Liqueur	55.0	Absente Liqueur
	$1.17	Yukon Jack Cordials	50.0	Rumple Minze Schnapps
	$7.59	Chambord Liqueur	15.0	Dulseda Dulce de Leche Liqueur
	$7.91	Nuvo Sparkling Liqueur	15.0	Thatcher's Liqueurs
	$9.54	Godiva Liqueurs	15.0	Llord's Cordials
Gin	$0.53	Bowman's Gin	47.0	Bombay Sapphire Gin
	$0.56	Aristocrat Gin	46.8	Tanqueray Gin
	$0.57	Barton Gin	46.7	Beefeater Gin
	$2.66	Bulldog Gin	40.0	Many
	$2.67	Martin Miller's Gin	39.8	Seagram's Gin
	$2.69	Pocket Shot Gin	30.0	Dekuyper Gin
Rum	$0.59	Gold Crown Rums	51.8	Paramount Rums
	$0.59	Aristocrat Rums	47.9	Gosling's Rums
	$0.63	Jenkins Rums	47.0	Kraken Rums
	$3.49	Atlantico Rums	21.6	Malibu Rums
	$4.39	Ron Zacapa Rums	21.0	Coconut Jack Rums
	$4.84	Coyopa Rums	18.0	Island Breeze Rums
Scotch	$0.85	Clan MacGregor	46.0	Ardbeg
	$0.92	Old Smuggler	44.9	Talisker
	$0.97	Scoresby	44.1	Balvenie
	$4.64	Sheep Dip	40.0	Many
	$4.68	Buchanan's	38.3	Buchanan's
	$5.03	Talisker		
Tequila	$1.20	Sauza	40.0	All brands
	$1.34	Margaritaville		
	$1.36	Jose Cuervo		
	$19.68	Gran Patron		
	$21.45	Cabo Uno		
	$27.00	Casa Dragones		
Vodka	$0.51	McCall's	44.3	Mr. Boston
	$0.51	Zelko	42.0	42 Below
	$0.54	Mr. Boston	41.0	Stolichnaya

Alcoholic Beverage Type	Three Cheapest and Three Most Expensive Brands in Terms of Average Price Per Ounce of Alcohol		Three Highest and Three Lowest Brands in Terms of Average Alcohol Percent by Volume (%)	
	Price	**Brand**	**ABV**	**Brand**
	$4.05	Ultimat	35.4	Sweet Carolina
	$4.39	Crystal Head	35.0	Firefly
	$5.36	Jean-Marc XO	35.0	Jeremiah Weed
Whiskey	$0.61	Five Star	50.0	Yukon Jack Canadian
	$0.64	Northern Light Canadian	42.6	Suntory
	$0.64	Beam's 8 Star Blended	41.0	Wild Geese Irish
	$2.81	Wild Geese	40.0	Many
	$2.84	Pocket Shot	39.4	Phillips Union
	$4.51	Suntory		
Low-end fortified wine	$0.90	Night Train	17.5	Night Train
	$0.91	Cisco	17.3	Cisco
	$0.92	Wild Irish Rose	15.2	Thunderbird
	$1.03	Mad Dog 20/20	14.4	Wild Irish Rose
	$1.04	Thunderbird	13.1	Mad Dog 20/20
Wine	$0.70	Franzia	20.0	Taylor Fladgate Port
	$0.95	Charles Shaw	19.9	Croft Port
	$1.39	Fisheye	19.8	W & J Graham's
	$50.47	Chateau Pichon-Longueville	7.0	Rosa Regale
	$59.30	Chateau Ducru-Beaucaillou	6.9	Arbor Mist
	$86.18	Chateau Latour	6.0	Wild Vines
Grain alcohol	$0.52	Gem Clear 190	95.0	All other brands
	$0.63	Everclear 190	75.5	Everclear 151
	$0.66	Golden Grain 190		
	$0.77	Clear Spring 190		
	$0.82	Everclear 151		
Alcoholic whipped cream	$4.32	Whipped Lightning	18.1	Whipped Lightning
	$5.79	CREAM	15.0	CREAM

Notes: Average price per ounce of alcohol for each alcohol brand represents the average of the price for that brand across all stores in which it was available. Average alcohol by volume for each alcohol brand represents the average of the alcohol content for that brand across all stores in which it was available. ABV = percent alcohol by volume.

Table 3

Top 25 Alcohol Brands in Terms of Lowest Price Per Ounce of Alcohol, with Alcoholic Beverage Type and Percent Alcohol by Volume

Alcohol Brand	Alcoholic Beverage Type	Average Price per Ounce of Alcohol	Average Alcohol by Volume, %
McCall's Vodka	Vodka	$0.51	40.0
Zelko Vodka	Vodka	$0.51	40.0
Tilt	Flavored alcoholic beverage	$0.52	12.0
Gem Clear	Grain alcohol	$0.52	95.0
Bowman's Gin	Gin	$0.53	40.0
Mr. Boston Vodka	Vodka	$0.54	44.3
Evil Eye	Flavored alcoholic beverage	$0.55	10.0
Crystal Palace	Vodka	$0.56	40.0
Aristocrat Gin	Gin	$0.56	40.0
Nikolai Vodka	Vodka	$0.56	40.0
Taaka Vodka	Vodka	$0.57	40.0
Barton Gin	Gin	$0.57	40.0
Aristocrat Vodka	Vodka	$0.58	40.0
Five O'Clock Gin	Gin	$0.58	40.0
Nikolai Gin	Gin	$0.58	40.0
Banker's Club Gin	Gin	$0.58	40.0
Crystal Palace Gin	Gin	$0.58	40.0
Skol Vodka	Vodka	$0.59	40.0
Gold Crown Rum	Rum	$0.59	40.0
Five O'Clock Vodka	Vodka	$0.59	40.0
Fleischmann's Vodka	Vodka	$0.59	39.7
Aristocrat Rum	Rum	$0.59	40.0
Five Star Whiskey	Whiskey	$0.61	40.0
McCormick's Gin	Gin	$0.62	40.0
Jenkins Rum	Rum	$0.63	40.0

Notes: Average price per ounce of alcohol is the mean price for each alcohol brand across all stores at which the brand was available. Average alcohol by volume is the mean alcohol content for each alcohol brand across all stores at which the brand was available.

Table 4

Top 25 Flavored Alcoholic Beverage and Low-end Fortified Wine Brands in Terms of Highest Average Percentage Alcohol by Volume

Alcohol Brand	Alcoholic Beverage Type	Average Alcohol by Volume, %	Total Volume of Alcohol per 8 Ounce Serving	Average Price per Ounce of Alcohol
Potter's Long Island Iced Tea	Flavored alcoholic beverage	40.0	3.2	$0.69
Barton Long Island Iced Tea	Flavored alcoholic beverage	37.5	3.0	$0.74
Desert Island Long Island Iced Tea	Flavored alcoholic beverage	37.5	3.0	$0.76
McCormick Long Island Iced Tea	Flavored alcoholic beverage	37.5	3.0	$0.77
Montebello Long Island Iced Tea	Flavored alcoholic beverage	21.0	1.7	$1.20
DeKuyper Ready to Drink Shots	Flavored alcoholic beverage	20.0	1.6	$1.88
Night Train	Low-end fortified wine	17.5	1.4	$0.90
Cisco	Low-end fortified wine	17.3	1.4	$0.91
Captain Morgan's Cocktails	Flavored alcoholic beverage	17.1	1.4	$1.96
American Sweetheart Cocktails	Flavored alcoholic beverage	17.0	1.4	$2.64
Margarita King Margaritas	Flavored alcoholic beverage	17.0	1.4	$3.78
Cocktails by Jenn	Flavored alcoholic beverage	17.0	1.4	$5.20
The Club Cocktails	Flavored alcoholic beverage	16.9	1.4	$1.76
Thunderbird	Low-end fortified wine	15.2	1.2	$1.04
Burnett's Cocktails	Flavored alcoholic beverage	15.0	1.2	$1.46
Mr. Boston Egg Nog	Flavored alcoholic beverage	15.0	1.2	$1.66
Evan Williams Egg Nog	Flavored alcoholic beverage	15.0	1.2	$1.84
Southern Comfort Cocktails	Flavored alcoholic beverage	15.0	1.2	$2.06
Malibu Cocktails	Flavored alcoholic beverage	15.0	1.2	$2.18
Wild Irish Rose	Low-end fortified wine	14.4	1.1	$0.92
Smirnoff Malt Beverages	Flavored alcoholic beverages	14.3	1.1	$2.38
Bacardi Malt Beverages	Flavored alcoholic beverages	13.8	1.1	$2.13
Icebox Cocktails	Flavored alcoholic beverages	13.6	1.1	$1.68
Mad Dog 20/20	Low-end fortified wine	13.1	1.0	$1.03
Salvador's Margaritas	Flavored alcoholic beverages	13.0	1.0	$1.48

Notes: Average alcohol by volume is the mean alcohol content for each alcohol brand across all stores at which the brand was available. Average price per ounce of alcohol is the mean price for each alcohol brand across all stores at which the brand was available.