Methods

We used a variety of publicly available data sources and methods to provide a comprehensive analysis of the sugary drink market in the United States. We evaluated the nutritional content of sugary drinks and the marketing practices of 23 different beverage companies. Using the same methods as our 2011 report,[1] we also measure changes over the past three years.

Our methods include the following analyses: sales of sugary drinks and other drink products; the nutritional quality of sugary drinks, and diet children's drinks and energy drinks and energy shots; content analysis of nutrition-related messages, child-directed messages, and promotions on product packaging; media exposure and advertising spending using Nielsen and comScore syndicated data; and marketing to youth on company websites, internet display advertising, social media, and mobile marketing. We supplement these analyses with information collected from company websites, monitoring of business and consumer press, and numerous visits to retail establishments and calls to beverage company consumer helplines. These methods are described in detail in the following sections.

We did not have access to beverage industry proprietary documents, including privately commissioned market research, media, and marketing plans or other strategic documents. Therefore, we do not attempt to interpret companies' strategies or objectives for their marketing practices. Rather, we provide transparent documentation of: 1) the nutritional quality of sugary drinks; 2) the extent of children's and teens' exposure to common forms of sugary drink marketing, including exposure by black and Hispanic youth, and comparisons to marketing for diet drinks, 100% juice, and plain water; 3) marketing messages conveyed in traditional and digital media; and 4) changes in nutrition and marketing that occurred from 2010 to 2014.

Scope of the analysis

We focus our analyses on **sugary drinks**, defined as any non-alcoholic refreshment beverage containing at least one gram of added sugar per 8-ounce serving, including sugars from all sources except fruit juice concentrate, fruit juice, or fruit puree. We also include diet children's drinks, diet energy drinks, and energy shots in our analyses of unhealthy drinks. In some analyses, we also include diet soda and other diet drinks, 100% juice, and plain noncarbonated water for comparison purposes.

To narrow down the list of drink products to evaluate, we obtained sales data from IRI.[2] For all brands within all beverage subcategories, IRI provided total dollar sales at U.S. supermarkets, convenience stores, drug stores, and mass merchandisers in 2013. We also utilized Nielsen data to identify brands that were advertised in any form of measured media in 2013 and amount spent on advertising.

We first identified IRI beverage subcategories that contained drinks with added sugar. Within these subcategories, we selected all brands with $5 million or more in nationwide sales in 2013. We also selected brands with $1 to $5 million in sales that qualified as children's drinks (see category definitions below) or that had $100,000 or more in advertising spending in 2013 (according to Nielsen). From this list, we excluded the following for all categories except energy drinks and children's drinks: 1) brands that did not have products with added sugar; and 2) powders and liquid drink mixes, cocktail mixes, smoothies, and protein drinks. For children's drinks, we included powders and liquid drink mixes, as well as drinks that contained artificial sweeteners but no added sugar (i.e., diet drinks) in our analyses. For energy drinks, we also included energy drinks and shots that contained artificial sweeteners but no added sugar.

Sugary drink market

We assigned a company, brand, and drink category designation to all products identified above.

- **Company** refers to the company that is listed on the product package or that owns the official website for the product.

- **Brand** references the marketing unit for each beverage. Brands may include numerous flavors or varieties of the same product (e.g., Vitamin Water Focus, Vitamin Water Essential). Brands can also have products in multiple categories or subcategories (e.g., Capri Sun fruit drinks and Capri Sun Roarin' Waters flavored water, Ocean Spray full-calorie and reduced-calorie fruit drinks). When a brand offers products in more than one category, each brand/category combination is presented separately in our analyses. For example, advertising for Capri Sun fruit drinks and advertising for Capri Sun Roarin' Waters flavored water are identified separately.

- If a brand includes **sub-brands** that differ substantially in nutrition quality and/or marketing practices, differences between sub-brands are identified in the appropriate results section. For example, Pepsi advertises both full-calorie Pepsi and reduced-calorie Pepsi NEXT. Results for the Pepsi regular soda brand include both sub-brands, but marketing that specifically identifies either full-calorie Pepsi or Pepsi NEXT is described in the results.

- Individual **products** are highlighted or described in more detail in the nutrition section. Products include different flavors or varieties of a brand or sub-brand.

Drink categories

Category describes the type of beverage (e.g., regular soda, sports drink). The beverage categories in this report include products that tend to be grouped together in industry reports

and previous research on sugary drink consumption. In some cases, we also classified products into subcategories to identify those with similar nutritional properties or marketing characteristics.

We assigned all brands to one of the following six sugary drink categories:

- **Regular sodas** are carbonated, sugar-sweetened soft drinks. These products are also known as "pop."

- **Fruit drinks** are fruit-flavored, non-carbonated drinks with 0% to 50% fruit juice. Manufacturers refer to these products as juice drinks, juice beverages, fruit cocktails, and fruit-flavored drinks. This category also includes powdered and liquid drink mixes and diet drinks for children's drinks only.

- **Flavored water** includes non-carbonated drinks described as "water beverages" on the product container or that contain the word "water" in the drink name. This category also includes diet children's flavored water.

- **Sports drinks** are marketed as drinks that should accompany physical activity. They carry the label "sports drink" and explicitly convey that the product should be consumed in conjunction with sports activities.

- **Iced teas/coffee** includes both types of sugary drinks. Iced teas are sugar-sweetened ready-to-drink teas. Coffee drinks include chilled, ready-to-serve products with "coffee" or a variation of coffee in the name.

- **Energy drinks** are liquid products labeled by the manufacturer as "energy drinks" or "energy supplements" that usually contain high levels of caffeine (typically 80 mg per serving or greater). This category includes carbonated, canned drinks as well as energy shots, which are concentrated and typically come in 1.8- to 2.5-ounce individual serving containers. Diet energy drinks and shots are included in this analysis, as the American Academy of Pediatrics has recommended that children and teens never consume these products.[3]

We also identified subcategories of sugary drinks based on evidence of child-targeted marketing and the amount of added sugar in the product.

- **Children's drinks** designate brands and products promoted as intended specifically for children by the beverage company in its media advertising or on company websites. Diet children's fruit drinks and flavored water with nonnutritive sweeteners (zero-calorie sweeteners) are also included as these drinks are not recommended for children.[4]

- **Full-calorie** drinks contain more than 40 calories per 8-ounce serving. Most, if not all, of the sugar in these products is added, but they may also contain naturally-occurring sugar from fruit juice. Some full-calorie drinks also contain zero-calorie sweeteners.

- **Reduced-sugar** drinks are lower-sugar, reduced-calorie drinks with 40 or fewer calories per 8-ounce serving. This definition of reduced-calorie was adopted from *Recommendations for Healthier Beverages* developed by a national panel of experts.[5] The experts recommended non-caffeinated, non-fortified beverages with no more than 40 calories per container as healthier drink choices for adolescents. Reduced-sugar drinks often contain zero-calorie sweeteners in addition to added sugar. The drink name may contain the words "light" or "diet," or it may give no indication that the drink is lower in calories.

As a point of comparison with sugary drinks, we also analyzed marketing for **other drink categories**, including healthier products such as water and 100% juice, as well as zero-calorie, diet products offered by brands that also offer sugary drinks.

- **Diet drinks** contain zero-calorie sweeteners and zero grams of added sugar. They may contain minimal calories from other carbohydrate sources, but most have no calories. Unsweetened zero-calorie products are not included in this category (e.g., flavored seltzer). Within the diet drinks category, we identify **diet soda**, which includes carbonated soft drinks with zero-calories sweeteners and less than two grams of sugar per eight ounces, and **other diet drinks**, which includes diet iced teas, sports drinks, and flavored water.

- **100% juices** are products that contain calories only from fruit and/or vegetable juice and do not contain added sugars or nonnutritive sweeteners.

- **Light fruit juices** contain juice diluted with water, as well as zero-calorie sweeteners, but no added sugar (e.g., V8 Fusion Light, Trop 50). These products are typically advertised as reduced-calorie juice drinks.

- **Plain water** includes noncarbonated products labeled as "water" that are not sweetened.

Nutritional content

We collected nutrition information for the sugary drinks, diet children's drinks and energy drinks, and energy shots in our analysis from company or brand websites in March to June 2014. If nutrition and/or ingredient information was not provided online, researchers made at least two calls to companies' customer service representatives. If information could not be obtained in this way, researchers visited local stores to obtain nutrition information from beverage packages. Finally, researchers utilized Gigwalk mobile work marketplace[6] to hire field personnel in other regions of the country to take pictures of nutrition facts panels with their mobile phones.

To standardize the nutrition analyses, we report calories, sugar, sodium, and caffeine per 8-ounce serving of a product, with the exception of products only available in a single-serving container, such as children's fruit drink pouches or energy shots. We report nutrition information per container for these products.

We report the following measures of nutrition content for the products in our analysis:

- **Nutrition information** includes calorie, sugar, and sodium content per serving provided on the nutrition facts panels. Median and range of values per serving are provided.

- **Ingredient information** includes caffeine, % juice, and zero-calorie sweetener content. This information may be provided on product packages, typically within or near ingredient lists. However, we were unable to obtain this information for many of the products in our analysis. When available, caffeine content is reported per serving. Juice is reported as % of total volume, and presence of zero-calorie sweeteners is noted (yes or no).

- **Zero-calorie sweeteners** refer to all nonnutritive (non-caloric) sweeteners, including artificial and natural sweeteners. Artificial sweeteners in this report include acesulfame potassium, aspartame, sucralose, and neotame. Stevia (also called rebiana or Red A) is the only natural sweetener found in drinks in this report.

To analyze changes in nutritional content from 2011 to 2104 by brand, we included only brands with data available for both years. This analysis also included all products that existed for these brands in 2011, even if the product was discontinued or did not meet our criteria to include in the 2014 analysis. In addition, new products for these brands that did not meet our criteria for inclusion were included in the 2014 comparison. A full list of all products analyzed can be found in **Appendix B**, which includes an indicator for products only included in the comparative analysis. We also include a comparison of the nutritional content of children's fruit drinks with the nutrition of other fruit drinks.

Marketing practices

Our analysis of sugary drink marketing practices documents marketing on product packaging; advertising spending in measured media; advertising and brand appearances on TV; marketing in digital media, including beverage company websites and display advertising on third-party websites; and newer forms of digital marketing, including in social media and on mobile devices. We also identify marketing that appears to be targeted to children, teens, and black and Hispanic youth.

on-package marketing

We conducted a content analysis of the marketing messages that appear on sugary drink product packaging, including nutrition-related messages, promotions, and evidence of child targeting. We collected the data by surveying product packages in two large supermarkets in Bridgeport and Hamden, Connecticut during July 2014. Researchers used a codebook to record all messages found on the packaging.

Prior to data collection, two researchers visited one of the supermarkets to identify the flavors, varieties, and forms of packaging available for the drinks included in our analysis. They also conducted a preliminary assessment of the marketing messages that appeared on product packaging. During these visits, researchers compared the messages on differ-

ent forms of packaging for each product (e.g., 2-liter bottles and multipacks of individual cans for sodas). If products in a beverage category had multiple forms of packaging, but the messages on packaging tended to be similar, just one type of package was coded. However, if the messages on different packaging for the same drink differed considerably, each type of package was coded separately. All flavors of each brand available for the selected package types were coded. Energy drinks were excluded from this analysis.

We coded the following package types for the sugary drink categories examined:

- Regular soda brands: both 12-can cardboard multipacks and 2-liter bottles, when available.

- Children's fruit drinks: cardboard or other multipacks of pouches and boxes.

- Other fruit drinks: single-serving bottles when available, otherwise the largest multi-serving container available (e.g., 64-, 128-, or 256-oz jugs).

- Iced tea: single-serving bottles or cans when available, otherwise the largest multi-serving container available (e.g., 64-oz jug).

- Sports drinks: single-serving container (i.e., 20-oz bottle) or multi-serving container (i.e., 32-oz bottle) when available.

- Flavored water: 20-ounce bottles, except Capri Sun Roarin' Waters (the 10-pack carton multipack was coded).

The codebook for this analysis was based on the codebook from a previous analysis of marketing on sugary drink packages,[7] with modifications based on new messages that appeared frequently on drink packaging as identified in the preliminary store visits. The coding manual outlined three main categories of messages: marketing tactics (URLs and promotions), nutrition-related messages (ingredient claims, natural messages, calorie labels, and other health-related messages), and child features.

- **Nutrition-related messages** describes all types of messages about product nutrition, including claims about ingredients, natural claims, calorie labels, and other health-related messages.

- **Promotions** include a wide range of marketing strategies, such as contests and giveaways, celebrity endorsements, entertainment tie-ins (e.g., movies, music), cause-related marketing, and education. We specify eleven categories of promotional messaging and recorded brief descriptions of each promotion.

- **Child features** indicate the product is intended for child consumption, including cartoon brand characters and other cartoon pictures, any reference to children or families, fun messaging, and novelty shapes.

Due to the many different nutrition-related messages appearing on product packages, we created subsets of these messages as follows:

- **Ingredient claims** refer to messages regarding micronutrients (i.e., vitamins and minerals), antioxidants, and electrolytes, as well as sugar, artificial flavors, colors, and sweeteners, gluten-free, and caffeine content.

- **Natural claims** include messages about natural flavors or sugars, in addition to real, organic, and GMO references.

- **Calorie labels** refer to calorie counts (per serving or per container) indicated on the product package, not including information on the nutrition facts panel.

- **Other health-related messages** refer to messages that imply health-related benefits from consuming the products, including hydration, exercise performance, and energy.

A team of seven or eight researchers conducted both in-store surveys in pairs to ensure that all messages were recorded. In addition to coding the existence of each type of message, researchers recorded the specific message. They also wrote in any additional messages that were not included on the coding form, such as "please recycle." All nutrition-related messages, promotions, and child features were recorded regardless of their location on the package, excluding messages on the nutrition facts panel.

We analyzed the on-package marketing data by brand and drink category. Duplicates of packages coded in both stores were removed from the analysis. We provide the percentage of packages that included each type of message, as well as the average number of these messages per package (only for packages containing these messages). Ingredient claims, natural claims, calorie labels, and other health-related messages were coded separately and combined for total nutrition-related messages per package. Percentage of packages with promotions and any child features, as well as the average number of child features per package were also calculated.

Traditional media

To analyze advertising spending and TV advertising exposure, we licensed data from Nielsen for 2010 through 2013 in the following non-alcoholic beverage categories: drink product, soft drink, regular soft drink, diet soft drink, drinks-isotonic, bottled water, fruit drinks, fruit juice, iced tea, drink mix, iced tea mix, and drink mix-isotonic. These Nielsen categories incorporate all of the sugary drink and diet drink categories in our analysis, as well as 100% juice and plain water.

However, the Nielsen categories and brands do not always correspond directly with the categories and brands in our analyses. For example, Nielsen's drink-isotonic category includes both energy drinks and sports drinks, and its bottled water category includes both plain and flavored water. Therefore, we used the descriptions provided by Nielsen to assign each Nielsen brand to the appropriate brand, category, and subcategory (if applicable) in our analysis. In some cases, the description could apply to more than one brand and/or category or subcategory (e.g., Coca-Cola soft drinks, Capri Sun drink products). When brands included products in more than one category or subcategory and the Nielsen data did not specify the product advertised, we assigned the brands to one of two brand-level categories. In some cases, Nielsen identified only a company and not a specific brand. We categorized these as company advertising.

- The **soda brand** category includes brand-level advertisements that cannot be classified as either regular or diet soda advertising. Soda brands sometimes advertise both regular and diet versions of the brand in the same advertisement, or they advertise the brand (e.g., Coca-Cola) but not a specific product (e.g., Coca-Cola Classic or Diet Coke). In these instances, Nielsen classifies the category as "soft drink" or "drink products."

- Brand-level advertising that promotes products in other (not soda) drink categories are categorized as **other sugary drink brand** advertising. For example, some Snapple advertising is classified by Nielsen as "drink products," or product placements just show the Snapple logo. This advertising supports Snapple products in multiple categories, including fruit drinks, regular iced tea, and diet iced tea products.

- **Company** advertising includes advertising that promotes a company but does not identify a specific brand (e.g., Dr Pepper Snapple Group). These ads are categorized as "drink products" by Nielsen.

In all marketing analyses, brand-level advertising is identified separately, unless otherwise noted. Company-level advertising is included in total advertising for the company, but not included in advertising for the specific brands.

Advertising spending

Nielsen tracks total spending to purchase advertising in 18 different media including TV (including Spanish-language TV), internet, radio, magazines, newspaper, free standing insert coupons (FSIs), and outdoor advertising. These data provide a measure of **advertising spending**. We licensed these data for all non-alcoholic beverage categories for the four-year period and report these numbers by brand, company, and category.

TV advertising exposure

To measure exposure to TV advertising, we also licensed **gross rating points (GRP)** data from Nielsen for the same period and beverages. GRPs measure the total audience delivered by a brand's media schedule. It is expressed as a percent of the population that was exposed to each commercial over a specified period of time across all types of TV programming. It is the advertising industry's standard measure to assess audience exposure to advertising campaigns, and Nielsen is the most widely used source for these data.[8] GRPs, therefore, provide an objective assessment of advertising exposure. In addition, GRPs can be used to measure advertisements delivered to a specific audience, such as an age or other demographic group (also known as target rating points or TRPs), and provide a per capita measure to examine relative

exposure between groups. For example, if a sugary drink brand had 2,000 GRPs in 2013 for 2- to 11-year-olds and 1,000 GRPs for 25- to 49-year-olds, then we can conclude that children saw twice as many ads for that brand in 2013 compared with adults.

The GRP measure differs from the measure used to evaluate food industry compliance with their CFBAI pledges. The pledges apply only to advertising in children's TV programming as defined by audience composition (e.g., programs in which at least 35% of the audience are younger than age 12); however, less than one-half of all advertisements viewed by children younger than 12 occur during children's programming.[9] In contrast, GRPs measure children's total exposure to advertising during all types of TV programming. Therefore, evaluating GRPs indicates whether participating companies reduced total TV advertising to this age group.

In the TV advertising analyses, we obtained 2010 through 2013 GRP data by age group and race. We first obtained total GRPs for the following age groups: **preschoolers** (2-5 years), **children** (6-11 years), **teens** (12-17 years), **young adults** (18-24 years), and **adults** (25-49 years). These data provide total exposure to national (network, cable, and syndicated) and local (spot market) TV combined. We also obtained GRPs for advertising viewed by black and white youth in the same age groups on national TV only, as Nielsen does not provide spot market GRPs for blacks by age group. Spot TV advertising accounted for 2% to 3% of all beverage advertising viewed by children and teens during 2013.[10] Therefore, these data reflect an estimated 97% to 98% of black youth exposure to all beverage advertising on TV. To assess exposure by Hispanic youth to Spanish-language advertising, we provide GRP data for advertising that occurred on Spanish-language TV.

Nielsen calculates GRPs as the sum of all advertising exposures for all individuals within a demographic group, including multiple exposures for individuals (i.e., gross impressions), divided by the size of the population, and multiplied by 100. GRPs can be difficult to interpret. Therefore, we also use GRP data to calculate the following TV advertising measures:

- **Average advertising exposure.** This measure is calculated by dividing total GRPs for a demographic group during a specific time period by 100. It provides a measure of ads viewed by individuals in that demographic group during the time period measured. For example, if Nielsen reports 2,000 GRPs for 2- to 5-year-olds for a brand in 2013, we can conclude that on average all 2- to 5-year-olds viewed 20 ads for that brand in 2013.

- **Targeted GRP ratios.** As GRPs provide a per capita measure of advertising exposure for specific demographic groups, we also used GRPs to measure relative exposure to advertising between demographic groups. We report the following targeted GRP ratios:

  - **Preschooler:adult targeted ratio** = GRPs for 2-5 years/ GRPs for 25-49 years

- **Child:adult targeted ratio** = GRPs for 6-11 years/GRPs for 25-49 years

- **Teen:adult targeted ratio** = GRPs for 12-17 years/GRPs for 25-49 years

- **Black:white child targeted ratio** = GRPs for blacks 2-11 years/GRPs for whites 2-11 years. This measure uses only national GRPs.

- **Black:white teen targeted ratio** = GRPs for blacks 12-17 years/GRPs for whites 12-17 years. This measure only uses national GRPs.

A targeted ratio greater than 1.0 indicates that on average persons in the group of interest (e.g., children in the child:adult ratio) viewed more advertisements than persons in the comparison group (i.e., adults). A targeted ratio of less than 1.0 indicates that the person in the group of interest viewed fewer ads. For example, a child-to-adult targeted ratio of 2.0 indicates that children viewed twice as many ads as adults viewed. If this ratio is greater than the relative difference in the amount of TV viewed by each group, we can conclude that the advertiser likely designed a media plan to reach this specific demographic group more often than would occur naturally. The average weekly amount of time spent viewing TV in 2012 was obtained from Nielsen Market Breaks for each age and demographic group in the analysis.

Brand appearances on prime-time TV

Nielsen data also were used to quantify beverage **brand appearances** that aired during prime-time TV programming from January 2010 through December 2013 for the same Nielsen non-alcoholic beverage categories used in the TV advertising exposure analysis. Nielsen defines a brand appearance as any occasion when a brand or product is conveyed, visually and/or audibly, or used in a particular way within a program. To be counted as a visual hit, 50% or more of a brand logo or product name must be visible. Each time a brand is conveyed in a program in a different manner (e.g., on a product package, apparel, screen graphic) it is counted as a separate brand appearance. If a brand appears multiple times in a program in the same manner (e.g., beverage bottle only), it is counted as one occurrence. Although most brand appearances in TV programming are product placements, Nielsen cannot determine whether appearances are the result of paid efforts by advertisers. Therefore, we use the term brand appearances unless the news media or other sources have identified specific appearances as paid product placements.

Nielsen recorded all TV programming from 6:00 p.m. to 12:00 a.m. daily (i.e., prime-time) that aired on 16 of the most frequently viewed broadcast and cable TV channels: ABC, CBS, NBC, FOX, CW, A&E, Bravo, DSC, ESPN, FX, LIFE, NAN, TBS, TLC, TNT, and USA. Data analysts reviewed the recordings using standardized identification procedures to count all brand appearances. The data exclude appearances on sports, news magazine, and holiday programming; made-for-TV movies and theatrical movies aired on TV; documentaries and non-fiction reports; programming on

children's TV networks; and repeat episodes. Nielsen also provides the **screen time**, or number of seconds, that each brand appearance lasted, as well as the number of **telecasts** featuring brand appearances.

Nielsen's brand descriptions were used to assign brand appearances to the brands, companies, and categories in our analyses. There were some differences between the Nielsen categories for TV advertising and brand appearances. First, we included brand appearances in the Nielsen category "Corp-Gen" for corporate sponsorships that clearly promoted drink products. Second, we assigned some appearances designated by Nielsen as company-level advertising to brand-level advertising when our review of the product appearances showed that these appearances promoted specific brands. We also used the other sugary drink brand category to indicate brands with products in multiple categories (e.g., Snapple includes fruit drinks and iced teas).

In addition to total number of telecasts featuring product appearances, we also report **average length per telecast**, calculated by dividing total screen time by total number of telecasts with appearances. We also used Nielsen GRP data to quantify exposure to brand appearances on average for children (2-11 years), teens (12-17 years), and adults (18-49 years) by brand, company, and category. Total GRPs for each age group were divided by 100 to obtain the number of brand **appearances viewed** on average by persons in each age group.

Digital media marketing

We document three types of digital marketing to youth: beverage company websites, display advertising on other (i.e., third-party) websites, and social media marketing. Additionally, we provide examples of mobile apps offered by sugary drink brands.

As in traditional advertising, digital marketing also includes brand-level marketing messages. Some of these brand-level messages feature multiple products (e.g., Pepsi, Diet Pepsi, and Pepsi NEXT) in different drink categories or marketing that just shows a brand logo but does not specify a product. To determine the accurate product categories for digital marketing, researchers examined actual advertisements or marketing messages, such as company websites, display ads, and social media posts. If the marketing promoted just one drink category within a brand, that marketing was assigned to the specific brand and category promoted (e.g., Pepsi regular soda, Snapple iced tea). However, if the marketing promoted an overall soda brand (and did not specify a product) or promoted both diet and sugar-sweetened versions of the soda brand, it was categorized as **soda brand** advertising. Similarly, if the marketing promoted products for the same brand in multiple drink categories, it was categorized as **other sugary drink brand** advertising (e.g., Snapple, Welch's, Arizona). If the marketing promoted the company as a whole (e.g., Coca-Cola Company) or multiple brands from the same company, it was categorized as **company** advertising.

To identify beverage company websites, we obtained a list of websites from comScore Media Metrix for the companies in our analysis that existed during January through December 2013. For the purposes of this analysis, a website is defined as all pages containing the same stem URL. For example, Pepsi.com is the website of interest, and http://www.pepsi.com/en-us/d/thegame is an example of a secondary page contained within the site.

We obtained data on exposure to these websites from comScore Media Metrix Key Measures Report.[11] The company captures the internet behavior of a representative panel of about 250,000 users in the United States.[12] It is the nation's largest existing internet audience measurement panel. The firm collects data at both the household and individual level using Session Assignment Technology, which can identify computer users without requiring them to log in. The company uses these panel data to extrapolate its findings to the total U.S. population. Companies participating with comScore can also have census tags placed on their web content and advertisements to further refine audience estimates. Using the comScore panel, we identified individuals' exposure to beverage company websites, including exposure for both children and adults in the same household. The Media Metrix database provides internet exposure data for all websites visited by at least 30 of their panel members in a given quarter.[13] Media Metrix also provides exposure information by visitor age, ethnicity, and race for higher volume websites.

For each quarter during the January through December 2013 period, we also used the Media Metrix Key Measures Report to collect the following data for available beverage company websites: total unique visitors, total visits, average minutes per visit, and average visits per unique visitor. In addition, when enough website traffic was recorded in a given quarter we collected these measures separately for children, teens, and all youth, and for black and Hispanic youth.

In July 2013, comScore changed the age breaks available for different demographic groups. As a result, the specific ages reported differ by quarter as follows:

Demographic group	Age range: Jan-June 2013	Age range: July-Dec 2013
Children	2-11 years	2-12 years
Teens	12-17 years	13-17 years
All youth	2-17 years, 6-17 years*	2-17 years
Black youth	6-17 years	2-17 years
Hispanic youth	6-17 years	2-17 years

*For comparison to black and Hispanic youth

For each website in our analysis, we report the following website exposure measures:

- **Average unique visitors per month** for children (2-11/12 years), teens (12/13-17 years), all youth (2/6-17 years), and black and Hispanic youth (2/6-17 years). This measure was calculated by adding average total unique visitors per month (reported quarterly by comScore, from January through December 2013) for each demographic group divided by four (for four quarters).

- **Average visits per month,**[14] **average pages per month,** and **average time spent (min) per visit** for each unique visitor. Average monthly numbers (reported quarterly by comScore, from January through December 2013) were divided by the number of quarters for which data were available for each website.

For each of the demographic groups with data, we also report a **targeted index**, which measures the extent to which child or teen visitors to a website are over- or underrepresented compared to visitors to the internet overall and the extent to which black or Hispanic youth visitors to a website are over- or underrepresented compared to all youth visitors. Targeted indices greater than 100 signify that the demographic group was overrepresented on a website in relation to the comparison group; and targeted indices less than 100 signify that it was underrepresented. For example, if 40% of black youth visited Sprite.com, but 20% of all youth visited Sprite.com, the black youth targeted index for Sprite.com would be 200.

- **Child** and **teen targeted indices** were calculated by dividing the percent of visitors to the website who were children (2-11/12 years) or teens (12/13-17 years) by the percent of child and teen visitors to the total internet. First, the percent of visitors exposed to the website from each age group (2-11/12 years or 12/13-17 years) was obtained by averaging the number of monthly unique visitors to the website for that age group for the four quarters of 2013 and dividing that number by all average monthly unique visitors to the website (ages 2+). The same calculations were done for visitors to the total internet during the four quarters of 2013 for the same age group. The percent of child or teen visitors to the website was then divided by the percent of child or teen visitors to the total internet and multiplied by 100 to get the targeted index.

- **Black youth** and **Hispanic youth targeted indices** were calculated by dividing the percent of black or Hispanic youth (2/6-17 years) who visited the website by the percent of all youth (2/6-17 years) who visited the website. First, the percent of black or Hispanic youth who visited the website was obtained by averaging the number of monthly unique visitors to the website for that group for the four quarters of 2013 and dividing that number by all black or Hispanic youth visitors to the total internet. The same calculations were done for all youth visitors to the website during the four quarters of 2013. The percent of black or Hispanic youth who visited the website was then divided by the percent of all youth who visited the website and multiplied by 100 to get the targeted index.

Display advertising on third-party websites

Data for exposure to beverage company advertising on third-party websites (i.e. websites sponsored by other companies) were extracted from the comScore Ad Metrix Advertiser Report.[15] comScore Ad Metrix monitors the same panel of users as comScore Media Metrix but tracks advertisements that are completely downloaded and viewable on a user's web browser. Ad Metrix measures individual exposure to display ads presented in rich media (SWF files) and traditional image-based ads (JPEG and GIF files). It does not capture text, video, or html-based ads. Ad Metrix also identifies the unique user viewing the advertisement, the third- party website on which the advertisement was viewed, and the company sponsoring the advertisement.

Third-party website data were collected for January through December 2013. During the time period of our analysis, Ad Metrix did not report demographic information about the individuals who were exposed to these advertisements. Consequently, we cannot differentiate between exposure by any specific age group, including children, teens, Hispanics, or black youth.

The Product Dictionary from comScore was used to determine the display advertisements for the beverage companies in our analysis. comScore provides display ad data for brands, websites, and promotions (e.g., My Coke Rewards) in its dictionary that were viewed at least ten times by comScore panel members on the internet or on a specific publisher site. Ad Metrix captures copies of the actual display ads (i.e. creatives) that appeared on third-party websites. Researchers reviewed the creatives to identify the appropriate drink category to assign brands with products in multiple categories. Review of the creatives also revealed that some brands included display ads that were incorrectly assigned to the brand. For those brands, we calculated the proportion of creatives that portrayed the correct brand and adjusted the display ad measures as required. If 80% or more of the display ads for a given brand were accurate, we included all the display ads in our calculations. If less than 80% of the ads were accurate, we adjusted the number of ads by multiplying total display ads provided by comScore by the percent of accurate ads. All adjustments were made before calculating the measures below.

Measures available from comScore for each month include **total display ads viewed** (i.e., the number of advertisements fully downloaded and viewed on publisher websites), **advertising exposed unique visitors** (i.e., the number of different individuals exposed to advertisements on a publisher website), and **average frequency of ads viewed** per unique visitor by beverage company advertiser. This information is available for the total internet and for individual publisher (i.e., third-party) websites.

As we could not separate ads viewed by age group, we identified third-party websites on which the advertisements

appeared that were disproportionately visited by youth (i.e., youth websites) and children (i.e., children's websites). comScore Key Measures Report[16] was used to extract the average number of unique visitors to third-party websites. For each website, we calculated the **proportion of total unique visitors** who were youth and children by dividing the average number of unique youth (2-17 years) and child (2-11/12) visitors[17] by total unique visitors (2+ years) to the same website.[18]

We defined a **youth website** as a website that met one of two conditions: 1) It was identified by comScore as Family & Youth – Kids and/or Teens; or 2) the percentage of visitors ages 2-17 to the website exceeded the total percentage of visitors to the internet ages 2-17 during the time period examined. From this list of youth websites, we also identified websites that were targeted to children. We defined a **children's website** as a youth website that met two conditions: 1) over 20% of the unique visitors to the website were ages 2-11/12 years; and 2) the website had over 1 million beverage display ads. Because we are unable to differentiate between ads viewed by youth under 18 years or by children versus adults, we instead assume that advertising on youth and children's websites will be viewed by disproportionately more young people.

From the comScore data, we calculated the following measures for each brand (including websites and promotions) for which display advertising was found:

- **Average unique visitors per month**[19] was calculated by adding the number of unique visitors exposed to advertising for a brand or promotion reported monthly from January through December 2013 and dividing by 12.

- **Average number of ads viewed per viewer per month** was calculated by averaging the number of ads viewed per viewer for the brand or promotion for each month from January through December 2013.

- **Percentage of ads viewed on youth websites, children's websites, Facebook** and **YouTube** were calculated by dividing the total display ad impressions for the brand or promotion on each type of website by the total display ad impressions that appeared on all websites from January 2013 through December 2013.

- **Average monthly ads viewed on youth websites, children's websites, Facebook** and **YouTube** were calculated by adding display ad impressions for the brand or promotion appearing on each type of website reported monthly from January through December 2013 and dividing by 12.

Social media

We measured brands' marketing presence on five popular social media platforms: Facebook, Twitter, YouTube, Instagram, and Vine. In addition, we examined brand activity and engagement with users on Twitter.

We identified all available social media pages sponsored by beverage companies in a variety of ways. First, we identified all social media links from beverage company and brand websites. We then searched within each of the five social media platforms using the company and brand as keywords. This search identified hundreds of social media accounts. To narrow down the list of accounts for analysis, we excluded: 1) pages with less than 10,000 likes/followers on Facebook or Twitter; 2) pages not created or managed by the brand or company (e.g., Facebook community pages); 3) pages that had not been updated with posts or tweets since January 1, 2013; 4) pages that included food brands as well as beverages (e.g., Welch's, Starbuck's, and PepsiCo); and 5) pages for non-U.S. users or with the majority of content in a foreign language. We did include global brand pages in the analysis. Our search identified some social media pages for high-profile promotions (e.g., My Coke Rewards, Red Bull X-Fighters). Promotional social media pages were included in the analyses if they met the other criteria. One additional Instagram account was identified when the brand's main Instagram account "suggested' the account to follow.

In June 2014, we recorded the number of **likes** for each **Facebook** page in the analysis, the number of **followers** on **Twitter** pages, and the number of **viewers** on **YouTube** channels. To measure marketing on **Instagram** and **Vine**, we calculated the number of followers for individual accounts and examined the posts on each platform.

For Facebook and Twitter, we also calculated the changes in likes and followers, respectively, from 2011 to 2014. However, YouTube recently changed its methods for calculating views,[20][21] therefore we could not compare 2011 to 2014 YouTube views. On October 2, 2014 we utilized Social Baker,[22] an online analytics tool, to assess the average number of views per video currently uploaded on each of the top-ten YouTube sugary drink and energy drink brand channels.

To measure marketing on Twitter, we further examined each brand's engagement with its followers. We used Twitonomy to track activity on brands' Twitter accounts from January 2013 through June 2014. Twitonomy is a web-based Twitter analytics program that analyzes the tweets of any user with a public Twitter account (with a maximum of the most recent 3,200 tweets per account analysis).[23] Twitter activities analyzed include average number of **tweets per day**, percent of tweets that were replies to users, and proportion of tweets that were retweeted or favorited by other users. **Replies** are direct responses by brands to tweets sent by other Twitter users. **Retweets** are brand tweets that users have re-posted for their own followers to see. Users have the ability to mark a tweet as a **favorite**, thereby saving it in a special section on their profile page. A user's favorites can be viewed by other users, and indicates that the user finds the tweet of interest or value.

Smartphone applications

We used iTunes to identify smartphone applications available for download during August, 2014. Apps that represented an

official product offered by a beverage company were identified by determining whether the brand or company was listed as a copyright owner, developer or seller. Apps that listed a recognized company partner (e.g., McDonald's, Viacom) as the lead developer/seller and apps from developers that listed the sugary drink company as a client on its site were also included. In-app purchases and download costs were determined using iTunes. iTunes also lists the date on which the application was last updated. Apps that had not been updated in 2013 or later were excluded. Applications designed in a foreign language or explicitly for non-US markets were also excluded from the analysis.

After viewing screenshots of the apps and/or downloading them, a content analysis of the applications was conducted to designate apps with **child-targeted features** according to the following criteria:

- Promotes child-oriented events, themes, activities, incentives, products, or media;

- Includes mentions of "child," "young children," "kid," "child-oriented themes," or similar language in the app description or title;

- Features game play appropriate for the skill level of children, with activities such as matching, coloring, or others with low level of complexity;

- Prominently features child-oriented animated or licensed characters; and/or

- Prominently features a celebrity endorser popular with children.

These criteria provide a conservative estimate of child-targeting, as games with more realistic graphics also can have strong appeal for children.

Endnotes

1. Harris JL, Schwartz MB, Brownell KD, Javadizadeh J, Weinberg M, Sarda V, et al. (2011). Sugary Drink FACTS: Evaluating sugary drink nutrition and marketing to youth. www.sugarydrinkfacts.org/ resources/SugaryDrinkFACTS_Report.pdf.

2. IRI (2014). www.iriworldwide.com/About.aspx

3. Schneider MB, Benjamin HJ (2011). Sports drinks and energy drinks for children and adolescents: Are they appropriate? *Pediatrics, 127*(6), 1182-1189.

4. Institute of Medicine (2007). Nutrition standards for foods in schools: Leading the way toward healthier youth. www.iom.edu/Reports/2007/Nutrition-Standards-for-Foods-in-Schools-Leading-the-Way-toward-Healthier-Youth.aspx.

5. Healthy Eating Research (2013). Recommendations for Healthier Beverages. http://www.rwjf.org/en/research-publications/find-rwjf-research/2013/03/recommendations-for-healthier-beverages.html

6. Gigwalk Mobile Marketplace (2014). www.Gigwalk.com

7. Harris et al. (2011).

8. Nielsen (2010). Nielsen Monitor Plus AdViews. www.nielsenmedia.com.

9. Harris JL, Sarda V, Schwartz MB, Brownell KD (2013). Redefining "child-directed advertising" to reduce unhealthy television food advertising. *American Journal of Preventive Medicine*, 44(4), 358-364.

10. Rudd Center analysis of Nielsen data (2014).

11. comScore (2013). Media Metrix. Available at www.comscore.com/Products/Audience_Analytics/Media_Metrix.

12. comScore (2012). *State of the Internet in 2012*. Slide 8. http://www.slideshare.net/indigitalmd/comscore-state-of-us-internet-q1-2012.

13. comScore (2013). Media Metrix: Description of Methodology. http://www.journalism.org/files/2014/03/comScore-Media-Metrix-Description-of-Methodology.pdf.

14. The data used for average visits per month is comScore Media Metrix Key Measures Report's data for the measure: Average Visits per Visitor.

15. comScore (2013). *Ad Metrix*. Retrieved from www.comscore.net/Products_Services/Product_Index/Ad_Metrix

16. comScore (2013, January 2014). *Media Metrix - Key Measures*, retrieved from http://www.comscore.com/Products/Audience-Analytics/Media-Metrix

17. comScore AdMetrix & Key Measures for youth and child visitors to websites (January –December 2013)

18. comScore Key Measures for total audience visitors to third-party youth websites (February 2013- January 2014). comScore Key Measures for total audience visitors to social media sites (March 2013- February 2014).

19. The data used for monthly unique viewers is comScore Ad Metrix Advertiser Report's data for the measure: Advertising exposed unique visitors.

20. Simply Measured (2013). simplymeasured.com/blog/2013/04/08/youtube-changes/

21. Google Online Security (2014). googleonlinesecurity.blogspot.ca/2014/02/keeping-youtube-views-authentic.html

22. Social Baker (2014). www.socialbakers.com/youtube-statistics/

23. Twitonomy (2014). www.twitonomy.com