

SICKLY SWEET: WHY FOCUS ON SUGARY DRINKS?



Although many factors influence unhealthy weight and diet-related chronic diseases, sugary drinks play a key role.

Some argue that singling out sugary drinks does not make sense because any sugary food can be consumed in moderation and people eat many sugary foods. The fact is, however, that sugary drinks have become a daily habit for many — not a special treat — and they are the single largest source of added sugars in our diets. The scientific evidence connecting sugary drink consumption and poor health also continues to grow. This is why reducing sugary drink consumption is widely supported by public health authorities, including the Centers for Disease Control and Prevention, the National Academies of Science, the American Medical Association, the American Heart Association, the American Academy of Pediatrics, and the American Cancer Society.¹



The Public Health Law Center and the American Cancer Society have partnered to develop resources to help organizations create healthier food environments, with a special focus on hospital and healthcare settings. This publication, which is part of a larger toolkit, explains why reducing sugary drink consumption is a crucial part of organizational food service policies.

Sugary Drinks – The Largest Source of Added Sugar in U.S. Diets

Products containing added sugars (sugars added to food during processing or preparation) pervade the U.S. food supply — more than two-thirds of packaged foods and beverages purchased in the U.S. contain added sugar.² Although added sugar intake has decreased in recent years,³ most of the sugar consumed by Americans continues to come from added sugars, and a majority of adults still consume quantities of added sugar in excess of current dietary guidelines, which call for added sugars to make up no more than 10% of a person’s daily calories.⁴

Figure 1: What Is a Sugary Drink?

Sugary drinks contain added sugars, including high fructose corn syrup, honey, molasses, and other caloric sweeteners. These are examples of common sugary drinks:*

Soft drinks	Coke, Pepsi, Mountain Dew, Dr. Pepper
Fruit drinks[†]	Sunny D, Hawaiian Punch, Capri Sun
Tea and coffee drinks	Arizona Iced Tea, Snapple Iced Tea, Starbucks Bottled Frappuccino
Energy drinks	Red Bull, Monster, Rock Star
Sports drinks	Gatorade, Powerade
Sweetened milk[†]	Nesquik Chocolate Milk, Silk Vanilla Soy Milk



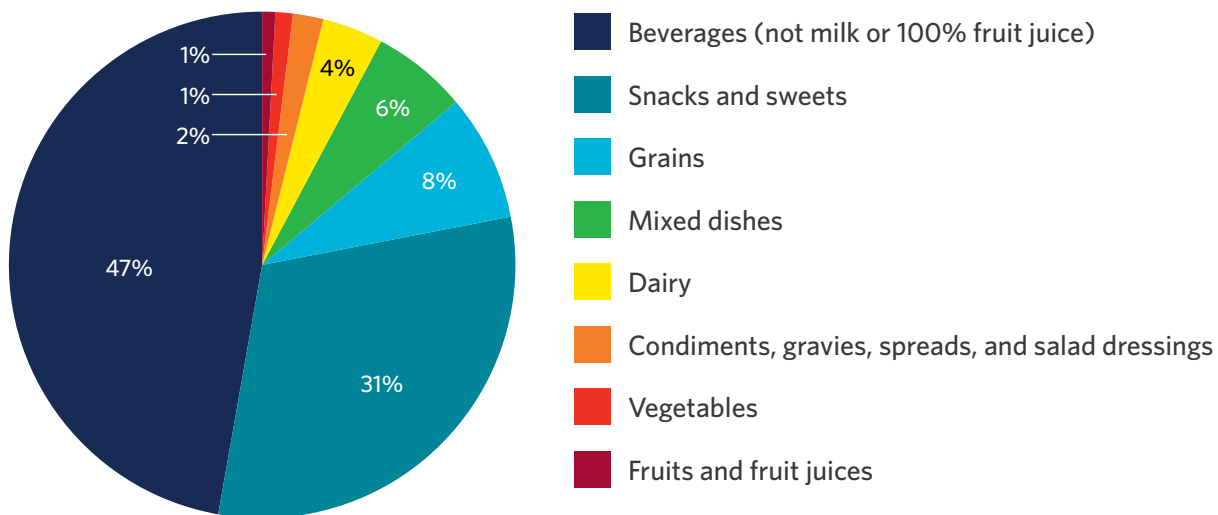
* This is not an exhaustive list. Furthermore, many of these drinks are now available in diet and low-calorie varieties, which are sweetened with non-caloric sweeteners.

† Flavored milks with added sugars sometimes are not considered sugary drinks because they provide some nutritional value despite being sugary. 100% fruit juice sometimes is not classified as a sugary drink because it does not contain added sugars; however, health experts recommend portion control and limited consumption because juice is sugary.

Added sugars account for more than 13% of all calories in the U.S. diet, and sugary drinks are the largest source of added sugar for all age groups⁵ (see Figure 2). For example, a 20-ounce bottle of sugary soda contains the equivalent of 17 teaspoons of added sugar.⁶ Forty-six percent of adult males and 38% of adult females consume at least one sugary drink on one or more days per week, resulting in an average daily intake of 23 ounces and 16 ounces, respectively.⁷ Higher

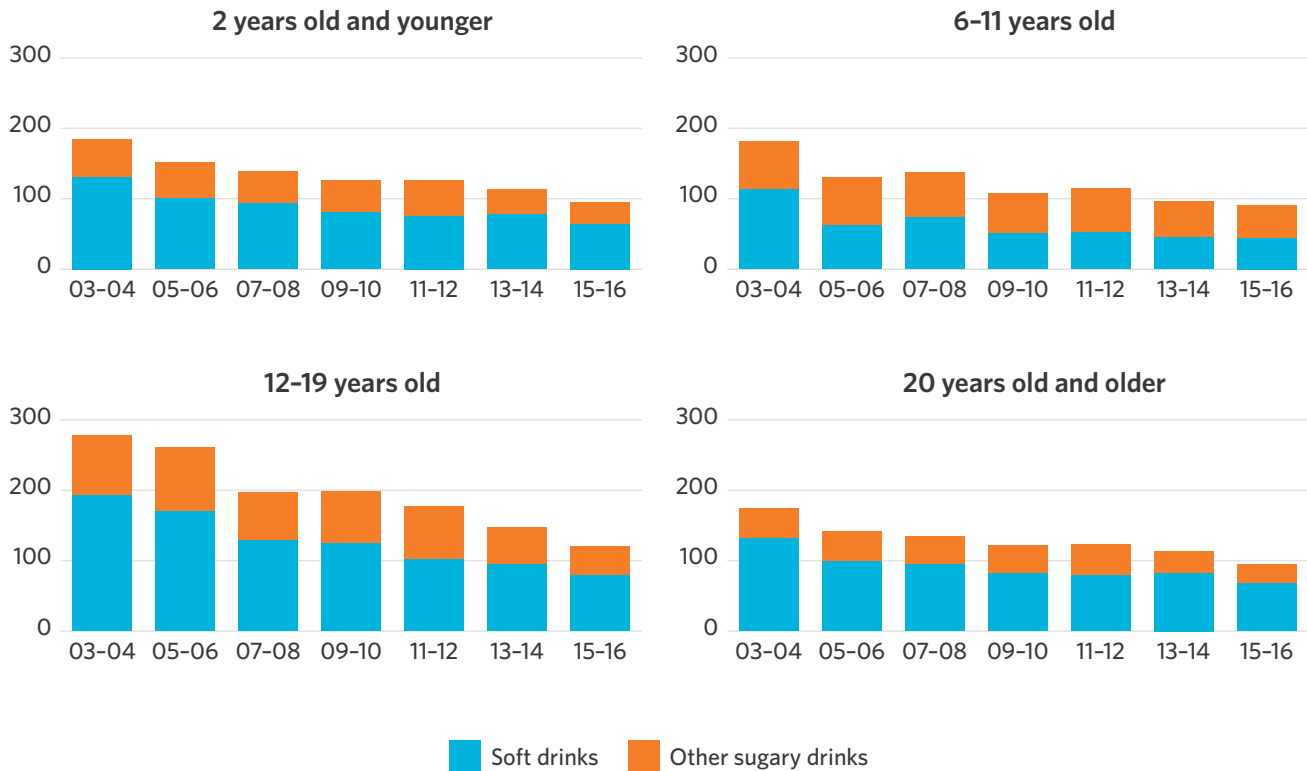
intake of sugary drinks is more common among adults and children of color and American Indian/Alaska Native peoples,⁸ adults with less education, adults who currently smoke and who are physically inactive,⁹ adults with a disability,¹⁰ those from lower income households,¹¹ and those living in certain regions of the country.¹² For example, non-Hispanic Black children aged 4-5 years consumed 59% more sugary drinks in 2011-2014 compared to their non-Hispanic white counterparts (9.12 ounces versus 5.74 ounces),¹³ and in 2016, non-Hispanic Black and Hispanic adults were 71% more likely to be daily sugary drink consumers compared to non-Hispanic white adults.¹⁴ Although national data for American Indians/Alaska Natives is lacking, studies from individual states have found that daily sugary drink consumption was 23% more prevalent among American Indian/Alaska Native adults in Arizona in 2017,¹⁵ and heavy sugary drink consumption (three or more per day) was 58% more prevalent among American Indian/Alaska Native adults in Oklahoma in 2015 compared to their white counterparts.¹⁶

Figure 2: Sources of Added Sugar in the U.S. Population, Ages Two Years and Older¹⁷



Children and adolescents are even less likely than adults to meet the current recommended limits for added sugar consumption,¹⁸ and sugary drinks are the most popular beverage consumed after water. In fact, nearly one-third of children ages one to two years old, half of children ages two to five years old, and 58% of children and adolescents six to 19 years old consume a sugary drink on any given day.¹⁹ Similar to adults, there are notable disparities in sugary drink consumption among children and adolescents. In 2015-2016, 67% of non-Hispanic Black children and adolescents ages two to 19 years old consumed sugary drinks daily compared to 51% of their non-Hispanic white counterparts.²⁰

Figure 3: Trends in Daily Energy Intake (kcal) from Sugary Drinks from 2003–04 to 2015–16 by Age Group, United States²¹



While there has been a decline in overall sugary drink consumption over the past two decades, progress has stagnated in recent years (see Figure 3).²² One factor has been the rise of energy drink consumption among youth and young adults. Between 2003 and 2016, consumption increased 600% and 1000% respectively among these groups.²³

Researchers have documented that sugary drink companies frequently target their marketing toward communities of color and other socially disadvantaged and marginalized groups, which contributes to disparities in sugary drink consumption.²⁴ Food marketing studies by the UConn Rudd Center on Food Policy & Obesity have repeatedly found that food and beverage companies “often target Black and Hispanic consumers with marketing for their least nutritious products, primarily fast-food, candy, sugary drinks, and snacks.”²⁵ For example, a 2019 Rudd Center report found that advertisements for sugary drinks were more likely than any other food and beverage category to be targeted to Black and Hispanic consumers.²⁶

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Sugary Drinks and Health Risks

Most sugary drinks offer “empty” calories, meaning they have no nutritional value and do nothing to support health. Sugary drink consumption also is often associated with an unhealthy diet pattern and increased energy intake.²⁷ The fact that sugary drinks are liquid calories is a major factor in why regulating energy intake is harder for people when consuming sugary drinks. Liquid calories are not as filling as calories from solid food, and studies indicate that people who add calories to their diet through sugary drinks do not tend to reduce the calories they consume from other sources.²⁸

Whatever the biological mechanism, sugary drink consumption has been consistently linked to body weight, weight gain, and obesity. Since 2006, at least nine systematic reviews have reached this conclusion.²⁹ For example, one study found that a one-serving-per-day increase in sugary drink consumption was associated with a 0.25–0.5 pound increase in weight over a one-year period.³⁰ For children and adolescents, this same per-day increase in consumption was linked to a 0.06-unit increase in body mass index (BMI).³¹ Over time, these effects compounded. A different study, which pooled data from 1977 to 2007, concluded that sugary drinks likely accounted for at least 20% of the weight gained by Americans during this time.³²

Research has also observed associations between sugary drink consumption and long-term changes to visceral fat and waist circumference, which themselves are linked to other chronic conditions independent of weight gain.³³

Current obesity trends highlight the importance of focusing on sugary drinks. One in three Americans has obesity.³⁴ Between 1988-1994 and 2015-2016 the prevalence of obesity increased more than 70% among adults and 85% among children, and now 93.3 million adults and 13.7 million children have this chronic disease.³⁵ Obesity is also significantly more prevalent among non-Hispanic Black, Hispanic, and American Indian/Alaska Native adults and children compared to their non-Hispanic white counterparts.³⁶ In 2015-2016, 46.8% of non-Hispanic Black, 47.0% of Hispanic, and 43.7% of American Indian/Alaska Native adults had obesity compared to 37.9% of non-Hispanic white adults.³⁷ The same year, 22.0% of non-Hispanic Black, 25.8% of Hispanic, and 29.7% of American Indian/Alaska Native children and youth had obesity compared to 14.1% of their non-Hispanic white counterparts.³⁸ Type 2 diabetes has followed a similar trajectory. The prevalence of diagnosed and undiagnosed diabetes in the U.S. increased from 8.8% in 1988-1994 to 13.9% in 2013-2016, with considerable disparities. In 2013-2016, 20.4% of non-Hispanic Black, 22.1% of Hispanic, and 23.5% of American Indian/Alaska Native adults had diabetes compared to 12.1% of non-Hispanic white adults.³⁹



In addition to diabetes,⁴⁰ weight gain and obesity,⁴¹ consumption of sugary drinks also is associated with higher risk for tooth decay,⁴² coronary heart disease,⁴³ hypertension,⁴⁴ stroke,⁴⁵ metabolic syndrome,⁴⁶ fatty liver disease,⁴⁷ mortality,⁴⁸ and worse overall cardiometabolic health.⁴⁹ More specifically, increasing sugary drink consumption merely by one serving per day increases a person's risk for type 2 diabetes by 13%, for stroke by 13%, and for heart attack by 22%.⁵⁰ Further, roughly 9% of type 2 diabetes cases in the US can be attributed to sugary drink consumption.⁵¹ Research also has found that daily sugary drink consumers have a 56% higher risk of developing fatty liver disease compared to non-daily consumers.⁵²

Although evidence linking sugary drinks and health consequences is clear and robust, food industry-funded research in this area has often led to some uncertainty. It is noteworthy that, similar to the experience with commercial tobacco-related research, food industry sponsorship of sugary drink research has been found to bias study results,⁵³ which contributes to ongoing challenges to efforts to interpret the state of evidence to inform public health action.⁵⁴

Conclusion

People in the U.S. consume too much added sugar, and sugary drinks are the single largest source of added sugars in most people's diets. Sugary drink consumption is a risk factor for a host of chronic conditions, including obesity, type 2 diabetes, heart disease, and tooth decay. People from low-income communities, communities of color and American Indian/Alaska Native populations consume more sugary drinks compared to white individuals, and these same groups are also at higher risk of developing diet-related chronic diseases. Reducing sugary drink intake lowers health risks among children and adults and is a public health priority. Hospitals and other organizations can play a key leadership role in these efforts by implementing food and beverage policies that promote healthy choices.



Additional Resources

The latest sugary drink trends, including those related to consumption and its health effects, are monitored by several organizations, including the [Centers for Disease Control and Prevention](#), [SugarScience at the University of California San Francisco](#), the [Harvard T.H. Chan School of Public Health](#), and [Healthy Food America](#).

The other resources in this series can be found on the Public Health Law Center's website at [publichealthlawcenter.org](#). The [Healthy Healthcare Toolkit](#) includes:

- *Beverage Policies & Drinks with Artificial Sweeteners*
- *Building Blocks for Success: Developing Healthy Beverage Policies & Initiatives*
- *Food & Beverage Pledges & Policies for Hospitals & Healthcare Systems*
- *Frequently Asked Questions about Healthy Beverage Initiatives*
- *Healthcare Can Lead the Way: Making the Healthy Choice the Easy Choice*
- *Healthy Beverage Hot Spots: Identifying & Utilizing the Institutional Access Points*
- *Healthy Beverage Policies, Healthy Bottom Lines*
- *Healthy Beverage Policies: Key Definitions & Sample Standards*
- *Sickly Sweet: Why Focus on Sugary Drinks?*
- *Thirsty for Health — Tap Water & Healthcare*

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Endnotes

- 1 See, e.g., CTNS. FOR DISEASE CONTROL AND PREVENTION, THE CDC GUIDE TO STRATEGIES FOR REDUCING THE CONSUMPTION OF SUGAR-SWEETENED BEVERAGES (2010), <https://stacks.cdc.gov/view/cdc/51532>; INST. OF MED., ACCELERATING PROGRESS IN OBESITY PREVENTION, SOLVING THE WEIGHT OF THE NATION 166-184 (Dan Glickman et al. eds., 2012); Am. Med. Ass'n, *AMA Adopts Policy to Reduce Consumption of Sugar-Sweetened Beverages*, <https://www.ama-assn.org/press-center/press-releases/ama-adopts-policy-reduce-consumption-sugar-sweetened-beverages> (last visited Sept. 6, 2019); Lawrence H. Kushi et al., *American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention*, 62 CA: CANCER J. CLINICIANS 30 (2012); Natalie D. Muth et al., *Public Policies to Reduce Sugary Drink Consumption in Children and Adolescents*, 143 PEDIATRICS 1, 7 (2019).
- 2 Barry M. Popkin & Corinna Hawkes, *The Sweetening of the Global Diet, Particularly Beverages: Patterns, Trends and Policy Responses for Diabetes Prevention*, 4 LANCET DIABETES ENDOCRINOLOGY 174, 176 (2016).
- 3 Between 2003-2004 and 2015-2016, the estimated mean intake of added sugar decreased by 20.2 grams, or 23% per person per day. SHANTHY A. BOWMAN ET AL., FOOD PATTERNS EQUIVALENTS INTAKES BY AMERICANS: WHAT WE EAT IN AMERICA, NHANES 2003-2004 and 2015-2016: DIETARY DATA BRIEF No. 20 1 (2018), https://www.ars.usda.gov/ARSUserFiles/80400530/pdf/DBrief/20_Food_Patterns_Equivalents_0304_1516.pdf.
- 4 SHANTHY A. BOWMAN ET AL., ADDED SUGARS INTAKE OF AMERICANS: WHAT WE EAT IN AMERICA, NHANES 2013-2014: DATA BRIEF No. 18 1 (2017), https://www.ars.usda.gov/ARSUserFiles/80400530/pdf/DBrief/18_Added_Sugars_Intake_of_Americans_2013-2014.pdf; SHANTHY A. BOWMAN ET AL., ADDED SUGARS INTAKE OF AMERICANS: WHAT WE EAT IN AMERICA, NHANES 2015-2016: DIETARY DATA BRIEF No. 24 1 (2019), https://www.ars.usda.gov/ARSUserFiles/80400530/pdf/DBrief/24_Sources_of_Added_Sugars_in_Adults'_Diet_2015-2016.pdf.
- 5 Regan L. Bailey et al., *Sources of Added Sugars in Young Children, Adolescents, and Adults with Low and High Intakes of Added Sugars*, 10 NUTRIENTS 102 (2018); U.S. DEP'T OF HEALTH AND HUMAN SERVS. AND U.S. DEP'T OF AGRIC., DIETARY GUIDELINES FOR AMERICANS: 2015-2020 EIGHTH EDITION 54 (2015), <https://health.gov/dietaryguidelines/2015/guidelines/>.
- 6 Y. Claire Wang et al., *A Penny-Per-Ounce Tax on Sugar-Sweetened Beverages Would Cut Health and Cost Burdens of Diabetes*, 31 HEALTH AFF. 199, 199 (2012).
- 7 ALANNA J. MOSHFEGH ET AL., BEVERAGE CHOICES AMONG ADULTS: WHAT WE EAT IN AMERICA, NHANES 2015-2016: Dietary Data Brief No. 21 2-3 (2019), https://www.ars.usda.gov/ARSUserFiles/80400530/pdf/DBrief/21_Beverage_choices_adults_1516.pdf.
- 8 See Jason F. Deen et al., *Cardiovascular Disease in American Indian and Alaska Native Youth: Unique Risk Factors and Areas of Scholarly Need*, 6 J. AM. HEART ASS'N 1 (2017).
- 9 Elizabeth A. Lundeen et al., *Daily Intake of Sugar-Sweetened Beverages Among US Adults in 9 States, by State and Sociodemographic and Behavioral Characteristics, 2016*, 15 PREVENTING CHRONIC DISEASE e154, e155 (2018).
- 10 Sunkyung Kim et al., *Daily Sugar-Sweetened Beverage Consumption, by Disability Status, Among Adults in 23 States and the District of Columbia*, 14 PREVENTING CHRONIC DISEASE e132, e132 (2018).
- 11 Tali Elfassy et al., *Sugary Drink Consumption Among NYC Children, Youth, and Adults: Disparities Persist Over Time, 2007-2015*, 44 J. COMMUNITY HEALTH 297, 299-300 (2019); Rosanna P. Watowicz & Christopher A. Taylor, *A Comparison of Beverage Intakes in US Children Based on WIC Participation and Eligibility*, 46 J. NUTRITION EDUC. BEHAV., s59, s60-s61 (2014).
- 12 Consumption has been found to be higher among adults living in the Northeast and South compared to other regions. Sohyun Park et al., *Prevalence of Sugar-Sweetened Beverage Intake Among Adults — 23 States and the District of Columbia, 2013*, 65 MORBIDITY MORTALITY WKLY. REP. 169, 169-171 (2016).
- 13 Elieke Demmer et al., *Ethnic Disparities of Beverage Consumption in Infants and Children 0-5 Years of Age; National Health and Nutrition Examination Survey 2011-2014*, 17 NUTRITION J. 1, 9 (2018).

- 14 Elizabeth A. Lundeen et al., *Daily Intake of Sugar-Sweetened Beverages Among US Adults in 9 States, by State and Sociodemographic and Behavioral Characteristics, 2016*, 15 PREVENTING CHRONIC DISEASE e154, e155 (2018).
- 15 Monique Adakai et al., *Health Disparities Among American Indian/Alaska Natives — Arizona, 2017*, 67 MORBIDITY MORTALITY WKLY. REP. 1316, 1314-1318 (2018).
- 16 Ashley H. White et al., *Sugar Sweetened Beverage Consumption Among Adults With Children in the Home*, 5 FRONTIERS IN NUTRITION, Art. 34 (May 2018).
- 17 Data from Regan L. Bailey et al., *Sources of Added Sugars in Young Children, Adolescents, and Adults with Low and High Intakes of Added Sugars*, 10 NUTRIENTS 102 (2018).
- 18 SHANTHY A. BOWMAN ET AL., ADDED SUGARS INTAKE OF AMERICANS: WHAT WE EAT IN AMERICA, NHANES 2013–2014: DATA BRIEF No. 18 1 (2017), https://www.ars.usda.gov/ARUserFiles/80400530/pdf/DBrief/18_Added_Sugars_Intake_of_Americans_2013-2014.pdf.
- 19 ALANNA J. MOSHFEGH ET AL., BEVERAGE CHOICES AMONG CHILDREN: WHAT WE EAT IN AMERICA, NHANES 2015–2016: DIETARY DATA BRIEF No. 22 4 (2019), https://www.ars.usda.gov/ARUserFiles/80400530/pdf/DBrief/22_Beverage_choices_children_1516.pdf; Melissa C. Kay et al., *Beverage Consumption Patterns Among Infants and Young Children (0-47.9 Months): Data from the Feeding Infants and Toddlers Study, 2016*, 10 NUTRIENTS 1, 6 (2018).
- 20 ALANNA J. MOSHFEGH ET AL., BEVERAGE CHOICES AMONG CHILDREN: WHAT WE EAT IN AMERICA, NHANES 2015–2016: DIETARY DATA BRIEF No. 22 4 (2019), https://www.ars.usda.gov/ARUserFiles/80400530/pdf/DBrief/22_Beverage_choices_children_1516.pdf.
- 21 Data from: Bernadette P. Marriott et al., *Trends in Intake of Energy and Total Sugar from Sugar-Sweetened Beverages in the United States among Children and Adults, NHANES 2003–2016*, 11 NUTRIENTS 1 (2019).
- 22 Christopher N. Ford et al., *10-Year Beverage Intake Trends Among U.S. Preschool Children: Rapid Declines Between 2003 and 2010, but Stagnancy in Recent Years*, 11 PEDIATRIC OBESITY 47, 50 (2016); Matthew M. Lee et al., *Secular Trends in Soda Consumption, California 2011–2016*, 16 PREVENTING CHRONIC DISEASE, e62, e64 (2019).
- 23 Kelsey A Vercammen, J. Wyatt Koma & Sara N. Bleich, *Trends in Energy Drink Consumption Among U.S. Adolescents and Adults, 2003–2016*, 56 AM. J. PREVENTIVE MED. 827, 830 (2019).
- 24 See Lisa M. Powell, Roy Wada & Shiriki K. Kumanyika, *Racial/Ethnic and Income Disparities in Child and Adolescent Exposure to Food and Beverage Television Ads Across U.S. Media Markets*, 29 HEALTH PLACE 124 (2014).
- 25 JENNIFER L. HARRIS ET AL., RUDD REPORT, INCREASING DISPARITIES IN UNHEALTHY FOOD ADVERTISING TARGETED TO HISPANIC AND BLACK YOUTH 4 (January 2019), <http://uconnruddcenter.org/files/Pdfs/TargetedMarketingReport2019.pdf>.
- 26 JENNIFER L. HARRIS ET AL., RUDD REPORT, INCREASING DISPARITIES IN UNHEALTHY FOOD ADVERTISING TARGETED TO HISPANIC AND BLACK YOUTH 36 (January 2019), <http://uconnruddcenter.org/files/Pdfs/TargetedMarketingReport2019.pdf>.
- 27 See Kiyah J. Duffey & Jennifer Poti, *Modeling the Effect of Replacing Sugar-Sweetened Beverage Consumption with Water on Energy Intake, HBI Score, and Obesity Prevalence*, 8 NUTRIENTS 395 (2016); Sohyun Park et al., *Consumption of Sugar-Sweetened Beverages Among US Adults in 6 States: Behavioral Risk Factor Surveillance System, 2011*, 11 PREVENTING CHRONIC DISEASE 1 (2014).
- 28 See, e.g., D.P. DiMaggio and R.D. Mattes, *Liquid Versus Solid Carbohydrate: Effects on Food Intake and Body Weight*, 24 INT'L J. OBESITY RELATED METABOLIC DISORDERS 794 (2000); Y. Claire Wang et al., *Impact of Change in Sweetened Caloric Beverage Consumption on Energy Intake Among Children and Adolescents*, 163 ARCHIVES PEDIATRIC ADOLESCENT MED. 336, 336-37 (2009); Kevin C. Mathias et al., *Foods and Beverages Associated with Higher Intake of Sugar-Sweetened Beverages*, 44 AM. J. PREV. MED. 351 (2013).

- 29 Vasanti S. Malik, Matthias B. Schulze & Frank B. Hu, *Intake of Sugary Drinks and Weight Gain: A Systematic Review*, 84 AM. J. CLINICAL NUTRITION 274, 282-285 (2006); Lenny R. Vartanian, Marlene B. Schwartz & Kelly D. Brownell, *Effects of Soft Drink Consumption on Nutrition and Health: A Systematic Review and Meta-Analysis*, 97 AM. J. PUB. HEALTH 667, 672 (2007); Vasanti S. Malik et al., *Sugar Sweetened Beverages, Obesity, Type 2 Diabetes and Cardiovascular Disease Risk*, 121 CIRCULATION 1356, 1357-1358 (2010); Lisa Te Morenga et al., *Dietary Sugars and Body Weight: Systematic Review and Meta-Analyses of Randomised Controlled Trials and Cohort Studies*, 346 BMJ 1, 6-7 (2013); Vasanti S. Malik et al., *Sugar-Sweetened Beverages and Weight Gain in Children and Adults: A Systematic Review and Meta-Analysis*, 98 AM. J. CLINICAL NUTRITION 1084, 1099 (2013); D. Ruanpeng et al., *Sugar and Artificially Sweetened Beverages Linked to Obesity: A Systematic Review and Meta-Analysis*, 110 QJM: INT'L J. MED. 513, 518 (2017); Maria Luger et al., *Sugar-Sweetened Beverages and Weight Gain in Children and Adults: A Systematic Review from 2013 to 2015 and a Comparison with Previous Studies*, 10 OBESITY FACTS 674, 686 (2018); Sara N. Bleich and Kelsey A. Vercammen, *The Negative Impact of Sugar-Sweetened Beverages on Children's Health: An Update of the Literature*, 5 BMC OBESITY 1, 2 (2018); Vasanti S. Malik and Frank B. Hu, *Sugar-Sweetened Beverages and Cardiometabolic Health: An Update of the Evidence*, 11 NUTRIENTS 2019 1, 3-4 (2019).
- 30 Vasanti S. Malik et al., *Sugar-Sweetened Beverages and Weight Gain in Children and Adults: A Systematic Review and Meta-Analysis*, 98 AM. J. CLINICAL NUTRITION 1084, 1099 (2013).
- 31 Vasanti S. Malik et al., *Sugar-Sweetened Beverages and Weight Gain in Children and Adults: A Systematic Review and Meta-Analysis*, 98 AM. J. CLINICAL NUTRITION 1084, 1099 (2013).
- 32 Gail Woodward-Lopez et al., *To What Extent Have Sweetened Beverages Contributed to the Obesity Epidemic*, 14 PUB. HEALTH NUTRITION 499, 505 (2011).
- 33 Jiantao Ma et al., *Sugar Sweetened Beverage Consumption is Associated With Change in Visceral Adipose Tissue Over 6 Years of Follow-Up*, 133 CIRCULATION 370, 372-373 (2016).
- 34 See CRAIG M. HALES ET AL., *PREVALENCE OF OBESITY AMONG ADULTS AND YOUTH: UNITED STATES, 2015-2016: NCHS DATA BRIEF No. 288 1-2* (2017).
- 35 TRUST FOR AM.'S HEALTH, *THE STATE OF OBESITY: BETTER POLICIES FOR A HEALTHIER AMERICA 2019 4* (2019), <https://www.tfah.org/wp-content/uploads/2019/09/2019ObesityReportFINAL-1.pdf>. Date ranges are based on survey periods of the National Health and Nutrition Examination Survey, administered by the Centers for Disease Control and Prevention. Compare CHERYL D. FRYAR ET AL., *PREVALENCE OF OVERWEIGHT, OBESITY, AND EXTREME OBESITY AMONG ADULTS: UNITED STATES, TRENDS 1960-1962 THROUGH 2009-2010 2* (2012) and CRAIG M. HALES ET AL., *PREVALENCE OF OBESITY AMONG ADULTS AND YOUTH: UNITED STATES, 2015-2016: NCHS DATA BRIEF No. 288 1-2* (2017). The American Medical Association recognized obesity as a disease in 2013. Andrew Pollack, *A.M.A. Recognizes Obesity as a Disease*, N.Y. TIMES, June 19, 2013, at B1.
- 36 See TRUST FOR AM.'S HEALTH, *THE STATE OF OBESITY: BETTER POLICIES FOR A HEALTHIER AMERICA 2019 4* (2019), <https://www.tfah.org/wp-content/uploads/2019/09/2019ObesityReportFINAL-1.pdf>.
- 37 See CRAIG M. HALES ET AL., *PREVALENCE OF OBESITY AMONG ADULTS AND YOUTH: UNITED STATES, 2015-2016: NCHS DATA BRIEF No. 288 1-2* (2017); U.S. DEP'T OF HEALTH AND HUMAN SERVS., OFFICE OF MINORITY HEALTH, *OBESITY AND AMERICAN INDIANS/ALASKA NATIVES* (2017), <https://minorityhealth.hhs.gov/omh/browse.aspx?vl=4&lvlid=40>.
- 38 See CRAIG M. HALES ET AL., *PREVALENCE OF OBESITY AMONG ADULTS AND YOUTH: UNITED STATES, 2015-2016: NCHS DATA BRIEF No. 288 1-2* (2017); Ann Bullock et al., *Obesity and Overweight in American Indian and Alaska Native Children, 2006-2015*, 107 AM. J. PUBLIC HEALTH 9, 1502 (2017).
- 39 See Andy Menke et al., *Prevalence of and Trends in Diabetes Among Adults in the United States, 1988-2012*, 314 JAMA 1021 (2015); Yiling J. Cheng et al., *Prevalence of Diabetes by Race and Ethnicity in the United States, 2011-2016*, 322 JAMA 2389 (2019).

- 40 See Fumiaki Imamura et al., *Consumption of Sugar Sweetened Beverages, Artificially Sweetened Beverages, and Fruit Juice and Incidence of Type 2 Diabetes: Systematic Review, Meta-Analysis, and Estimation of Population Attributable Fraction*, 50 BRIT. J. SPORTS MED. 496 (2015).
- 41 See Matthias B. Schulze et al., *Sugary Drinks, Weight Gain, and Incidence of Type 2 Diabetes in Young and Middle-aged Women*, 292 JAMA 927 (2004); Lenny R. Vartanian, Marlene B. Schwartz & Kelly D. Brownell, *Effects of Soft Drink Consumption on Nutrition and Health: A Systematic Review and Meta-Analysis*, 97 AM. J. PUB. HEALTH 667, 672 (2007).
- 42 See Eduardo Bernabe et al., *Sugar-Sweetened Beverages and Dental Caries in Adults: A 4-year Prospective Study*, 42 J. DENTISTRY 952 (2014).
- 43 See Chen Huang et al., *Sugar Sweetened Beverages Consumption and Risk of Coronary Heart Disease: A Meta-Analysis of Prospective Studies*, 234 ATHEROSCLEROSIS 1 (2014).
- 44 See Viranda H. Jayalath et al., *Sugar-Sweetened Beverage Consumption and Incident Hypertension: A Systematic Review and Meta-Analysis of Prospective Cohorts*, 102 AM. J. CLINICAL NUTRITION 914 (2015).
- 45 See Vasanti S. Malik et al., *Long-Term Consumption of Sugar-Sweetened and Artificially Sweetened Beverages and Risk of Mortality in US Adults*, 139 CIRCULATION 2113 (2019); Lawrence de Koning et al., *Sweetened Beverage Consumption, Incident Coronary Heart Disease, and Biomarkers or Risk in Men*, 125 CIRCULATION 1735 (2012).
- 46 See Danielle E. Haslam, *Interactions Between Genetics and Sugar-Sweetened Beverage Consumption on Health Outcomes: A Review of Gene-Diet Interaction Studies*, 8 FRONTIERS ENDOCRINOLOGY 1 (2018).
- 47 K. Wijarnpreecha et al., *Associations of Sugar- and Artificially Sweetened Soda with Nonalcoholic Fatty Liver Disease: A Systematic Review and Meta-analysis*, 109 QJM: INT'L J. MED. 461, 464 (2016).
- 48 See Lindsay J. Collin et al., *Association of Sugary Beverage Consumption With Mortality Risk in US Adults: A Secondary Analysis of Data from the REGARDS Study*, 2 JAMA NETWORK OPEN 1 (2019); Vasanti S. Malik et al., *Long-Term Consumption of Sugar-Sweetened and Artificially Sweetened Beverages and Risk of Mortality in US Adults*, 139 CIRCULATION 2113 (2019).
- 49 See Vasanti S. Malik and Frank B. Hu, *Sugar-Sweetened Beverages and Cardiometabolic Health: An Update of the Evidence*, 11 NUTRIENTS 1840 (2019).
- 50 See Vasanti S. Malik and Frank B. Hu, *Sugar-Sweetened Beverages and Cardiometabolic Health: An Update of the Evidence*, 11 NUTRIENTS 1840 (2019).
- 51 Fumiaki Imamura et al., *Consumption of Sugar Sweetened Beverages, Artificially Sweetened Beverages, and Fruit Juice and Incidence of Type 2 Diabetes: Systematic Review, Meta-Analysis, and Estimation of Population Attributable Fraction*, 351 BMJ 1, 8 (2015).
- 52 Jiantao Ma et al., *Sugar-Sweetened Beverage, Diet Soda, and Fatty Liver Disease in the Framingham Heart Study Cohorts*, 63 J. HEPATOLOGY 462, 467 (2015).
- 53 Maira Bes Rastrollo et al., *Financial Conflicts of Interest and Reporting Bias Regarding the Association Between Sugar-Sweetened Beverages and Weight Gain: A Systematic Review of Systematic Reviews*, 10 PLoS MED. 12, e1001578 (2013).
- 54 Ethan A. Litman et al., *Sources of Bias in Sugar-Sweetened Beverage Research: A Systematic Review*, 21 PUBLIC HEALTH NUTRITION 12, 2345-2350 (2018).