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Sugar-Sweetened Beverages and Health on Campus

When thinking about risky drinking in college, alcohol probably comes to mind. But there's another type of drink putting students at risk: sugar-sweetened beverages. Sugar-sweetened beverages include soda, sports drinks, energy drinks, fruit drinks, sweetened tea, and any other beverages that contain added sugars. Sugar-sweetened beverage consumption in the United States has declined since 2000,[1,2] but these drinks remain the leading source of added sugars in the U.S. diet.[3] College-aged young adults generally consume more calories from sugar-sweetened beverages than other age groups.[4] This is concerning because the transition from adolescence to young adulthood may be a critical time to establish eating habits that impact short- and long-term health.[5,6]

Consumption of sugar-sweetened beverages is linked to an increased risk of type 2 diabetes and cardiovascular disease[7, 8, 9]—in part by increasing the risk of weight gain[10,11]—and they contribute to dental decay,[12] according to several reviews and meta-analyses. As such, health authorities including the Centers for Disease Control and Prevention,[13] the National Academy of Sciences,[14] the National Heart, Lung, and Blood Institute,[15] the American Academy of Pediatrics,[16] the American College of Cardiology,[17] the American Diabetes Association,[18] the American Heart Association,[19] the American Medical Association,[20] the Academy of Nutrition and Dietetics,[21] the American Public Health Association,[22] and the European Association for Cardiovascular Prevention & Rehabilitation[23] recommend limiting consumption of sugar-sweetened beverages. This fact sheet summarizes the strongest evidence on health risks associated with sugar-sweetened beverages.

Sugar-sweetened beverage consumption is associated with adverse health outcomes

Weight Gain

As noted above, excess body weight increases the risk of chronic diseases including type 2 diabetes and heart disease.[24] Drinking sugar-sweetened beverages can lead to excess calorie intake because when people consume liquid calories, they do not compensate by eating fewer calories from solid foods.[25] In fact, randomized controlled trials in children and adults demonstrate that consumption of sugar-sweetened beverages lead to weight gain.[26,27,28] In studies that track people for years, those who consume sugar-sweetened beverages are more likely to gain weight over time. One meta-analysis reported a 55 percent increased odds of overweight or obesity in children who consumed at least one sugar-sweetened beverage per day compared to those who consumed little or none.[29] When researchers tracked more than 120,000 men and women for 16 to 20 years, the average participant gained 3.2 pounds over four years, which corresponds to a weight gain of 16 pounds over 20 years. Each additional daily serving of sugar-sweetened beverages was linked to an 0.8-pound weight gain over four years, accounting for 25 percent of the total weight gain in these participants.[30]

Type 2 Diabetes

According to a 2019 review article summarizing the evidence, people who frequently consume sugar-sweetened beverages have a higher risk of type 2 diabetes.[31] In a recent meta-analysis, each daily serving of these beverages was linked to a 26 percent higher risk of type 2 diabetes.[32] One study estimated that replacing one serving (8 oz.) of a sugar-sweetened beverage a day with a water, unsweetened coffee or tea, or reduced-fat milk was linked to a two to 10 percent lower risk of type 2 diabetes over the subsequent four years.[33]

Cardiovascular Disease

Sugar-sweetened beverage consumption is also linked to a higher risk of cardiovascular disease. In one meta-analysis, an increase of one serving per day was linked to a 22 percent increase in the risk of having a heart attack.[34]

Cavities

People who consume an 8 oz. sugary drink two to seven times per week are 57 percent more likely to have dental cavities than those who drink less or none. And those who drink more than seven sugary drinks per week are two times more likely to have cavities—and three times more likely to have dental erosion—than those who drink sugary drinks less than twice a week.[35]

Energy drinks pose additional risks

Energy drinks are sugar-sweetened beverages that carry additional health risks from added caffeine, and college-aged young adults are top consumers of these drinks.[36] The Food and Drug Administration recommends that adults consume no more than 400 mg of caffeine (equivalent to about four cups of coffee) per day. Consuming more can lead to adverse effects including headaches, fast heart rate, jitters, anxiousness, insomnia, upset stomach, nausea, and a feeling of unhappiness (dysphoria).[37] Consuming larger amounts can lead to more serious acute effects like cardiac, gastrointestinal, and nervous system disorders requiring emergency-room visits and hospitalization.[38] Yet, consuming three energy drinks in one day from popular brands can quickly exceed the recommended limits for caffeine and added sugars. For example, Monster Energy (a Coca-Cola product) contains 54 grams of sugar and 160 mg of caffeine per 16 oz can,[39] And Rockstar Energy (a PepsiCo product) contains 63 grams of sugar and 160 mg of caffeine per 16 oz can.[40]

Replacing sugar-sweetened beverages with healthier beverages may improve overall health

The 2020-2025 Dietary Guidelines for Americans recommends that individuals aged 2 and older get no more than 10 percent of their calories from added sugars.[41]

Among adults aged 19-30 years, an estimated 62 percent of males and 66 percent of females exceed the recommended limits for added sugar intake each day.[42][3] Replacing sugar-sweetened beverages with healthier beverages such as tap water, sparkling water, or unsweetened coffee or tea is an easy way to cut back on added sugars and possibly lower the risk of weight gain, type 2 diabetes, and heart disease.[43,44,45]

Universities should provide healthy campus beverage environments

Universities can support healthy beverage choices by providing adequate access to clean, filtered tap water throughout campus and healthy beverage options in retail spaces, and by limiting the sale and promotion of sugary drinks on campus.

For more information, please contact the Center for Science in the Public Interest at policy@cspinet.org.

[1] Wang L, Martínez Steele E, Du M, et al. (2021). Trends in Consumption of Ultraprocessed Foods Among US Youths Aged 2-19 Years, 1999-2018. *JAMA*. 326(6):519–530. doi:10.1001/jama.2021.10238

[2] Rehm, C, et al. (2016). Dietary intake among US 841 adults, 1999-2012. *J. Am. Med. Assoc*. 315(23):2542–2553.

[3] U.S. Department of Agriculture and U.S. Department of Health and Human Services. (2020). Dietary Guidelines for Americans, 2020-2025. 9th edition. (figure 1-10, p 43)

[4] Dai J, Soto MJ, Dunn CG, Bleich SN (2021). Trends and patterns in sugar-sweetened beverage consumption among children and adults by race and/or ethnicity, 2003-2018. Public Health Nutrition, 24(9):2405–2410. https://doi.org/10.1017/S1368980021001580

[5] Nelson MC, et al. Emerging Adulthood and College-aged Youth: An Overlooked Age for Weight-related Behaviour Change. *Obesity*. 2008;16:2205-2211.

[6] Christoph MJ, et al. Longitudinal trajectories and prevalence of meeting dietary guidelines during the transition from adolescence to young adulthood. *Am J Clin Nutr.* 2019;109(3):656-664.

[7] Malik VS, Hu FB. (2019). Sugar-sweetened beverages and cardiometabolic health: An update of the evidence. Nutrients. 11(8):1840.

[8] Neuenschwander M, et al. (2019). Role of diet in type 2 diabetes incidence: umbrella review of meta-analyses of prospective observational studies. *BMJ.*

[9] Narain A, et al. (2016). Soft drinks and sweetened beverages and the risk of cardiovascular disease and mortality: a systematic review and meta-analysis. Int J Clin Prac. 70(10):791-805.

[10] Malik VS, et al. (2013). Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. *Am J Clin Nutr*. 98:1084-1102.

[11] de Ruyter, JC, Olthof MR, Seidell JC, and Katan MB. (2012). A Trial of Sugar-Free or Sugar-Sweetened Beverages and Body Weight in Children. *New England Journal of Medicine* 367(15): 1397–1406. https://doi.org/10.1056/nejmoa1203034.

[12] Valenzuela MJ, et al. (2020). Effect of sugar-sweetened beverages on oral health: a systematic review and meta-analysis. *Eur J Public Health*. 31(1):122-129.

[13] Centers for Disease Control and Prevention. Get the Facts: Sugar-Sweetened Beverages and Consumption. February 27, 2017. https://www.cdc.gov/nutrition/data-statistics/sugar-sweetened-beverages-intake.html.

[14] Committee on Accelerating Progress in Obesity Prevention, Food and Nutrition Board, Institute of Medicine. Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation. National Academies Press. May 8, 2012. ncbi.nlm.nih.gov/books/NBK201139/; Committee on Prevention of Obesity in Children and Youth, Food and Nutrition Board, Institute of Medicine. Preventing Childhood Obesity: Health in the Balance. National Academies Press. 2005. https://doi.org/10.17226/13275.

[15] National Heart Lung and Blood Institute. Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents. U.S. Department of Health and Human Services, National Institutes of Health. 2013: 53. https://www.nhlbi.nih.gov/health-topics/integrated-guidelines-for-cardiovascular-health-and-risk-reduction-in-children-and-adolescents.

[16] Lott M, et al. Healthy Beverage Consumption in Early Childhood: Recommendations from Key National Health and Nutrition Organizations. Technical Scientific Report. Healthy Eating Research. 2019. https://healthyeatingresearch.org/research/technical-scientific-report-healthy-beverage-consumption-in-early-childhood-recommendations-from-key-national-health-and-nutrition-organizations/.

[17] Van Horn L, et al. Recommended Dietary Pattern to Achieve Adherence to the American Heart Association/American College of Cardiology (AHA/ACC) Guidelines: A Scientific Statement from the American Heart Association. Circulation. 2016;134(22):e505-e529.

[18] American Diabetes Association. Standards of Medical Care in Diabetes—2019. Diabetes Care. 2019;42(Suppl 1):S46-S60.

[19] Lichtenstein AH, et al. 2021 Dietary Guidance to Improve Cardiovascular Health: A Scientific Statement From the American Heart Association. Circulation. 2021;144:e472-e487.

[20] American Medical Association. Strategies to Reduce the Consumption of Beverages with Added Sweeteners H-150.927. 2017. https://policysearch.ama-assn.org/policyfinder/detail/sugar-sweetened%20beverages?uri=%2FAMADoc%2FHOD.xml-H-150.927.xml.

[21] Lott, 2019.

[22] American Public Health Association. Taxes on Sugar-Sweetened Beverages. October 30, 2012. https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/23/13/59/taxes-on-sugar-sweetened-beverages.

[23] Piepoli MF, et al. 2016 European Guidelines on Cardiovascular Disease Prevention in Clinical Practice: The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention

[24] Field AE, et al. Impact of Overweight on the Risk of Developing Common Chronic Diseases During a 10-Year Period**.** *Arch Intern Med*. 2001;161(13):1581-1586.

[25] DiMeglio DP, Mattes RD. Liquid versus solid carbohydrate: effects on food intake and body weight..Int J Obes Relat Metab Disord. 2000 Jun;24(6):794-800. doi: 10.1038/sj.ijo.0801229.

[26] de Ruyter JC, et al. A Trial of Sugar-Free or Sugar-Sweetened Beverages and Body Weight in Children. N Engl J Med. 2012;367(15):1397–406.

[27] Ebbeling CB, et al. A Randomized Trial of Sugar-Sweetened Beverages and Adolescent Body Weight. N Engl J Med. 2012;367(15):1407-16.

[28] Higgins KA, Mattes RD. A Randomized Controlled Trial Contrasting the Effects of 4 Low-Calorie Sweeteners and Sucrose on Body Weight in Adults with Overweight or Obesity. Am J Clin Nutr. 2019;109(5):1288–1301.

[29] Te Morenga L, Mallard S, Mann J. Dietary Sugars and Body Weight: Systematic Review and Meta-Analyses of Randomised Controlled Trials and Cohort Studies. BMJ. 2012;346:e7492.

[30] Pan A, et al. Changes in Water and Beverage Intake and Long-Term Weight Changes: Results from Three Prospective Cohort Studies. Int J Obes (Lond). 2013; 37(10):1378-85.

[31] Malik VS, Hu FB. (2019). Sugar-sweetened beverages and cardiometabolic health: An update of the evidence. Nutrients. 11(8):1840.

[32] Neuenschwander M, et al. (2019). Role of diet in type 2 diabetes incidence: umbrella review of meta-analyses of prospective observational studies. *BMJ.*

[33] Drouin-Chartier JP, et al. (2019). Changes in Consumption of Sugary Beverages and Artificially Sweetened Beverages and Subsequent Risk of Type 2 Diabetes: Results from Three Large Prospective U.S. Cohorts of Women and Men. *Diabetes Care.*

[34] Narain A, Kwok CS, Mamas MA. Soft drinks and sweetened beverages and the risk of cardiovascular disease and mortality: a systematic review and meta-analysis. Int J Clin Pract. 2016;70(10):791-805. doi:10.1111/ijcp.12841

[35] Valenzuela MJ, et al. (2020). Effect of sugar-sweetened beverages on oral health: a systematic review and meta-analysis. Eur J Public Health. 31(1):122-129.

[36] Dai, 2021.

[37] U.S. Food and Drug Administration. (2021). Spilling the Beans: How Much Caffeine is Too Much? https://www.fda.gov/consumers/consumer-updates/spilling-beans-how-much-caffeine-too-much

[38] Markon AO, et al. (2019). Caffeinated energy drinks: adverse event reports to the US Food and Drug Administration and the National Poison Data System, 2008 to 2015. *Public Health Nutrition.* 22(14):2531-2542.

[39] Sugar content obtained from product label. Caffeine content from: Monster Energy. The Original Green Monster Energy. https://www.monsterenergy.com/us/en/products/monster-energy/monster-energy.

[40] PepsiCo Beverage Facts. Rockstar Original. April 11, 2022. https://www.pepsicobeveragefacts.com/Home/product?formula=BACX513&form=RTD&size=16&PBF.

[41] U.S. Department of Agriculture and U.S. Department of Health and Human Services. (2020). Dietary Guidelines for Americans, 2020-2025. 9th edition. (figure 1-10, p 43)
[42] U.S. Department of Agriculture and U.S. Department of Health and Human Services. (2020). Dietary Guidelines for Americans, 2020-2025. 9th edition. (figure 1-10, p 43)
[43] de Ruyter JC, et al. A Trial of Sugar-Free or Sugar-Sweetened Beverages and Body Weight in Children. N Engl J Med. 2012;367(15):1397–406
[44] Drouin-Chartier JP, et al. (2019). Changes in Consumption of Sugary Beverages and Artificially Sweetened Beverages and Subsequent Risk of Type 2 Diabetes: Results from Three Large Prospective U.S. Cohorts of Women and Men. *Diabetes Care.*
[45] Narain A, et al. (2016). Soft drinks and sweetened beverages and the risk of cardiovascular disease and mortality: a systematic review and meta-analysis. Int J Clin Prac. 70(10):791-805.