



BEVERAGE POLICIES & DRINKS WITH ARTIFICIAL SWEETENERS



Hospitals implementing beverage policies are replacing sugary drinks¹ with healthier beverage options in their vending machines, soda fountains, catering services and other food services. These institutions are quickly faced with questions about whether to include artificially sweetened beverages.

Plain water and unsweetened low-fat or nonfat milk are still the healthiest replacements for sugary drinks, and unsweetened coffee, tea, and sparkling waters also rank high as healthier beverage options. But many artificially sweetened beverages are popular, and some national authorities recognize that artificially sweetened drinks can provide useful alternatives to sugary beverages for adults as a calorie reduction strategy (although consumption by children is not recommended).²



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 fact sheet, which is part of a larger toolkit, addresses some of the commonly asked questions about artificial sweeteners.

While there can be positive calorie reduction benefits for adults in switching from sugary to artificially sweetened (or “diet”) beverages, a growing body of research suggests that a simple net calorie calculation may not tell the whole story. The potential weight loss and other health impacts of “diet” drink consumption appear to be more complex and warrant continued research. Because the research is inconclusive, many institutions choose to include “diet” drinks as replacements for sugary drinks with the rationale that they would like to offer the widest range of low- or no-calorie beverages as possible, and “diet” drinks are preferable to sugary beverages in terms of calorie and carbohydrate intake. Others, however, have opted not to recommend them because of concerns about non-beneficial health impacts.

What Are Artificial Sweeteners and Who Consumes Them?

In this publication, the term “artificial sweeteners” refers to all substances that are added to food or drinks to make them taste sweeter without adding nutrients or calories. Experts also refer to these as nonnutritive sweeteners,³ high-intensity sweeteners,⁴ sugar substitutes, low-calorie or low-energy sweeteners, or non-caloric sweeteners.⁵ Most artificial sweeteners offer roughly 150 to over 600 times the sweetness of sugar with no or few calories.⁶ They are used in “diet” sodas, flavored drinks, yogurt, and other beverages and food products to reduce the number of calories and carbohydrates,⁷ and often in combination with other added sugars.⁸

Consumption of artificial sweeteners has increased in recent years, driven, in part, by consumers wanting food that tastes sweet but is not high in calories.⁹ In 2017, some 25% of children and 41% of adults consumed artificial sweeteners in any form, an increase of 200% in children and 54% in adults respectively compared to 2000.¹⁰ In particular, non-Hispanic white, higher-income, and more educated people are more likely to consume artificial sweeteners, as are people attempting to lose weight.¹¹

How Are Artificial Sweeteners Regulated?

Federal law allows substances — including artificial sweeteners — to be used in food or beverages if the use is permitted by the U.S. Food and Drug Administration (FDA) through a food additive regulation or if the use is “generally recognized as safe,” or GRAS.¹² Currently there are six artificial, high-intensity sweeteners approved by the FDA for use as a food additive: acesulfame-potassium,¹³ advantame,¹⁴ aspartame,¹⁵ neotame,¹⁶ saccharin,¹⁷ and sucralose.¹⁸ Food additive regulations specify how these substances may be used in food — in what types of food, in what quantities, and for what uses.¹⁹ Food manufacturers and other companies have also notified the FDA that they have determined some uses of steviol

glycosides (stevia-based sweeteners) and Luo Han Guo fruit extracts (also known as *Siraitia grosvenorii* Swingle fruit — or monk fruit — extract (SGFE)) to be GRAS, and the FDA has not objected to these determinations.²⁰ Sugar alcohols (such as sorbitol and xylitol), which are primarily used in sugar-free candies, gum and cookies, are also permissible sweeteners but are not considered high-intensity sweeteners because they typically are 25 to 100 percent as sweet as sugar.²¹ See Box 1 for more information about the FDA's GRAS process.

Box 1: What Is the Process for FDA's "Generally Recognized as Safe" Determinations?

Food companies are primarily responsible for deciding whether the use of a substance in food is "generally recognized as safe" or GRAS. Historically, the FDA affirmed the GRAS status of many substances added to food, including designated uses of certain artificial sweeteners. This changed, however, in 1997 when the FDA ceased reviewing GRAS affirmation petitions due to a lack of resources and began accepting GRAS notifications submitted by manufacturers or other interested parties.²² Food companies are not required to notify the FDA about their GRAS determinations, though they often do.²³ In response to these notices, the FDA can issue a "no questions" letter, a letter stating there is an insufficient basis for the GRAS determination, or a letter ceasing review at the company's request.²⁴ For example, over a dozen companies have submitted notices to the FDA that they have determined that stevia-based sweeteners are GRAS, and the FDA has not questioned these determinations.²⁵

Do "Diet" Drinks Help with Weight Loss?

Research is mixed as to whether artificially sweetened beverages are an effective weight loss aid. Adults who switch from sugary to artificially sweetened drinks often reduce their calorie intake in the short-term and show improvements in diet quality,²⁶ which often translates to lower adiposity and body weight.²⁷ This may explain why twice as many adults who are obese consume artificially sweetened beverages compared to those who are normal weight (22% versus 11%).²⁸

However, while artificially sweetened beverages may be beneficial compared to sugary drinks, abstaining from both is linked to superior diet quality across all weight categories.²⁹ Some research also suggests that individuals who drink artificially sweetened beverages may still end up consuming additional calories through other food and beverages, ultimately nullifying the caloric reduction achieved by drinking a "diet" beverage.³⁰ Researchers hypothesize this effect might be due to neurological changes associated with reward processing of sweet taste



that occur in people who frequently consume artificially sweetened beverages.³¹ Some findings suggest that the intense sweetness of artificial sweeteners may actually *increase* cravings for intensely sweet food or beverages, potentially undermining weight loss efforts.³² There is also evidence from numerous animal studies showing a linkage between artificial sweetener consumption and greater body fat, increased weight gain, and increased food consumption.³³

The inconclusive nature of artificial sweetener research is reflected in current dietary recommendations. The 2015–2020 Dietary Guidelines for Americans acknowledges the usefulness of artificial sweeteners for helping to reduce energy consumption, but suggests they may not be beneficial for long-term weight loss.³⁴ Similarly, in a 2018 Science Advisory regarding low-calorie sweetened beverages, the American Heart Association advised that their use “may be an effective strategy to help control energy intake and promote weight loss,” but nonetheless acknowledged that “there is a dearth of evidence on the potential adverse effects of [these] beverages relative to potential benefits.”³⁵ The Advisory also recognized that reducing sugary drink intake does not require substituting sugary drinks with artificially sweetened beverages, and that “potential benefits from these beverages as replacements for [sugary drinks] will not be fully realized if their use is accompanied by a compensatory increase in energy intake from other sources.”³⁶ Canada advises in its dietary guidelines that “[s]ugar substitutes do not need to be consumed to reduce the intake of free sugars”³⁷ and that “nutritious foods and beverages that are unsweetened should be promoted instead.”³⁸

Are There Other Health Risks Associated with Artificial Sweetener Consumption?

As availability of artificial sweeteners has increased, so has speculation about potential health risks. One speculation has been a linkage between artificial sweetener consumption and cancer risk, which has been observed in some animal studies.³⁹ However, the National Cancer Institute has thus far concluded that studies on artificial sweeteners “have not provided clear evidence of an association with cancer in humans.”⁴⁰ The American Cancer Society’s nutrition recommendations draw similar conclusions, noting that “[c]urrent evidence does not demonstrate a link between ingestion of these compounds [nonnutritive sweeteners or sugar substitutes] and increased cancer risk.”⁴¹

Aside from cancer, researchers have also investigated potential linkages with other chronic diseases.⁴² A recent study of women 50+ years of age found that higher intake of artificially sweetened beverages was associated with an increased risk of stroke and heart attack, coronary artery disease, and all-cause mortality, even after controlling for demographic characteristics, comorbidities, and other factors.⁴³ Other studies have observed similar linkages between consumption of artificially sweetened beverages and risk of developing metabolic syndrome and type 2 diabetes.⁴⁴ Research on consumption of artificially sweetened beverages during pregnancy found that it was associated with twice the risk of a child being overweight at one year of age when these beverages were consumed daily.⁴⁵

However, other studies have failed to observe associations between artificial sweetener consumption and various health outcomes.⁴⁶ These inconsistencies have led public health authorities, such as the American Heart Association, to conclude that there is still a lack of high-quality evidence on the health effects of prolonged artificially sweetened beverage consumption, including regarding cardiometabolic risk factors, and risk of cardiovascular and other chronic diseases.⁴⁷ As with sugary drinks, a history of industry involvement in research examining the health effects of consumption further complicates interpretations of the state of evidence on the topic.⁴⁸ For now, expert nutrition guidelines have yet to fully discourage their use among adults.⁴⁹

What Are the Recommended Practices for Children Concerning Artificial Sweeteners?

Public health authorities have consistently discouraged artificial sweetener consumption by children. The Robert Wood Johnson Foundation’s Healthy Eating Research Program has issued Consensus Statements on healthy beverage consumption in 2013⁵⁰ and 2019.⁵¹ These Statements advise that children should avoid consuming beverages with no- or low-

calorie sweeteners. Similarly, the American Heart Association's 2018 statement on artificial sweeteners states that "it is prudent to advise against prolonged consumption ... by children,"⁵² and a 2015 Clinical Report by the American Academy of Pediatrics stated, "Because there is no evidence of benefits of these products over plain water, artificially sweetened beverages currently have a limited place in a child's diet."⁵³

For older youth, the only consensus is that water and milk continue to be the best healthy options. The National Academy of Medicine (formerly known as the Institute of Medicine) recommended that standards for foods and beverages sold or served in schools include artificially sweetened beverages only as an option for high school aged youth, after the school day ends.⁵⁴

The U.S. Department of Agriculture (USDA)'s National School Lunch Program limits the sale of artificially sweetened drinks in schools that participate in federal school food programs.⁵⁵ Current program regulations do not allow drinks with added sugars, nor artificially sweetened drinks, to be sold in participating elementary⁵⁶ and middle schools,⁵⁷ with limited exceptions, or through the National School Lunch⁵⁸ and Breakfast programs.⁵⁹ The USDA does, however, allow high schools that participate in its programs to sell artificially sweetened beverages as "competitive foods" (which are foods sold outside of the national school meal programs, through a la carte menus, vending machines, fundraisers, school stores, etc.).⁶⁰ This federal "competitive foods" rule, which went into effect in September 2016, states that in addition to unflavored water, calorie-free flavored water, low- and non-fat milk, and 100% fruit or vegetable juices (which may be diluted with water but may not have added sweeteners), the sale of other low- and no-calorie beverages, within specified size and calorie limits, is allowed during and outside of the school day in high schools.⁶¹ It should be noted that states can pass their own school food regulations that are more restrictive than federal law.⁶²

What Approach Should Institutions Use in Developing Their Beverage Policies?

Hospital healthy beverage initiatives have taken varied approaches with respect to artificially sweetened beverages.⁶³ Many have chosen to offer artificially sweetened drinks but refrain from categorizing them as a "healthy" beverage. In this situation, a hospital may refer to its policy as a "Beverage Policy" rather than a "Healthy Beverage Policy." Or it may offer artificially sweetened beverages in certain outlets, such as cafeterias, but not in vending machines or gift stores. Similarly, a number of hospitals use a "red, yellow, green" labeling system that includes artificially sweetened beverages as a "yellow" option in all outlets, and may give these products less favorable pricing or placement compared to "green" options such as unsweetened water and unsweetened milk.

Some hospitals continue to categorize artificially sweetened beverages as “green” or “healthier choices,” such as the Johns Hopkins Health System in Maryland.⁶⁴ In contrast, some hospitals, such as Allina Health in Minnesota, have decided to limit the supply of artificially sweetened beverages in its facilities and discontinue recommending them as healthy beverage options.⁶⁵

The right approach for any given hospital or facility will depend on its culture and dynamics. Regardless of the approach decided on, communications strategies will be important for conveying the institution’s rationale to consumers, visitors, and other stakeholders.

Conclusion

The healthiest beverage choices continue to be unsweetened water and low and nonfat milk. Although the federal government and expert panels have deemed some artificial sweeteners safe from a food safety perspective, the science is not conclusive when it comes to other health impacts from drinking artificially sweetened beverages. It is important to note that when it comes to sugary beverages, the science is clear that they have contributed to the epidemic of unhealthy weights and are linked with serious chronic diseases including type 2 diabetes and heart disease. From an evidence-based perspective, if organizations are concerned about availability of time and resources to address food and beverage environment improvements, devoting time and energy to removing *sugary* drinks has the most support. Once that is accomplished, addressing artificially sweetened beverages could be a good next step.

Additional Resources

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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The Public Health Law Center provides information and legal technical assistance on issues related to public health. The Center does not provide legal representation or advice. This document should not be considered legal advice.

Endnotes

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- 49 In 2012, the Academy of Nutrition and Dietetics published a position paper on the use of nutritive and nonnutritive sweeteners which states that "consumers can safely enjoy a range of nutritive sweeteners and nonnutritive sweeteners (NNS) when consumed within an eating plan that is guided by current federal nutrition recommendations, such as the Dietary Guidelines for Americans and the Dietary Reference Intakes." Cindy Fitch & Kathryn S. Keim, *Position of the Academy of Nutrition and Dietetics: Use of Nutritive and Nonnutritive Sweeteners*, 112 *J. ACAD. NUTRITION DIETETICS* 739, 739 (2012).
- 50 HEALTHY EATING RESEARCH PROGRAM, ROBERT WOOD JOHNSON FOUND., RECOMMENDATIONS FOR HEALTHIER BEVERAGES 2 (2013), <http://healthyeatingresearch.org/wp-content/uploads/2013/12/HER-Healthier-Bev-Rec-FINAL-3-25-13.pdf>.

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- 53 Stephen R. Daniels et al., *The Role of the Pediatrician in Primary Prevention of Obesity*, 136 PEDIATRICS e275, e282 (2015).
- 54 COMM. ON STANDARDS FOR FOODS IN SCHS., NAT'L ACAD. OF MED., NUTRITION STANDARDS FOR FOODS IN SCHOOLS: LEADING THE WAY TOWARD HEALTHIER YOUTH 5 (2007), <http://www.nationalacademies.org/hmd/-/media/Files/Report%20Files/2007/Nutrition-Standards-for-Foods-in-Schools-Leading-the-Way-toward-Healthier-Youth/factsheet.pdf>.
- 55 National School Lunch Program, 7 C.F.R. § 210 (2019); School Breakfast Program, 7 C.F.R. § 220 (2019).
- 56 National School Lunch Program, 7 C.F.R. § 210.11(m)(1) (2019).
- 57 National School Lunch Program, 7 C.F.R. § 210.11(m)(2) (2019).
- 58 National School Lunch Program, 7 C.F.R. § 210.10(b) (2019).
- 59 School Breakfast Program, 7 C.F.R. § 220.8(b) (2019).
- 60 National School Lunch Program, 7 C.F.R. § 210.11(a)(2) (2019); 7 C.F.R. § 210.11(m)(3) (2019).
- 61 Among the allowed beverages in high schools are "other flavored and/or carbonated beverages (≤20 fl oz) that are labeled to contain <5 calories per 8 fl oz, or <10 calories per 20 fl oz" and "other flavored and/or carbonated beverages (≤12 fl oz) that are labeled to contain ≤40 calories per 8 fl oz, or ≤60 calories per 20 fl oz." National School Lunch Program, 7 C.F.R. § 210.11(m)(3) (2019).
- 62 National School Lunch Program, 7 C.F.R. § 210.11(b)(1) (2019).
- 63 These varied institutional policy approaches parallel a similar pattern seen with public policy approaches by local jurisdictions to tax sugary drinks. Some include artificially sweetened beverages, while others have not. Hunt Allcott, Benjamin B. Lockwood, & Dmitry Taubinsky, *Should We Tax Sugar-Sweetened Beverages? An Overview of Theory and Evidence*, 33 J. ECON. PERSP. 202 (2019), https://benlockwood.com/papers/Allcott_Lockwood_Taubinsky_SodaTaxesJEP.pdf.
- 64 JOHN HOPKINS MED., HUMAN RES., HEALTHY BEVERAGES: RETHINK YOUR DRINK, https://www.hopkinsmedicine.org/human_resources/benefits/healthy_at_hopkins/healthy_beverages/ (last visited Nov. 11, 2019).
- 65 As justification for this policy, Allina Health states that "research is starting to show that drinking these beverages may be bad for your health" and that "They provide zero nutrition...." ALLINA HEALTH, ABOUT US, CHOOSE HEALTHY FAQs, <https://www.allinahealth.org/about-us/healthy-food-and-beverages/choose-healthy-faqs> (last visited Nov. 11, 2019).