University of California
Research Consortium on
Beverages and Health

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Dockets Management Staff (HFA-305)
Food and Drug Administration
5630 Fishers Lane, Rm. 1061
Rockville, MD 20852

Comment on the U.S. Food and Drug Administration's Strategies to Reduce Added Sugars Consumption in the United States (Docket No. FDA-2023-N-3849)

Dear Dockets Management Staff:

The University of California Research Consortium on Beverages and Health respectfully submits the following comments on the U.S. Food and Drug Administration's (FDA's) Strategies to Reduce Added Sugars Consumption in the United States. Formed in 2018, the Consortium works to decrease consumption of sugary drinks and to increase consumption of water instead, throughout the UC system as well as at state and national levels. Our group, which consists of faculty from every UC campus, many of whom are nationally prominent in relevant disciplines, does this by conducting and disseminating cutting edge research.

We appreciate this opportunity to comment on added sugars and to recommend actions that FDA, and the U.S. Departments of Agriculture (USDA) and Health and Human Services (HHS) can take to reduce added sugars consumption by Americans. Reduction of added sugars consumption is a critical public health priority. In our comment, we suggest multiple strategies to reduce added sugars. However, we wish, simultaneously, to note our concerns over the proliferation of low- and no-calorie sweeteners (LNCS) in the food supply. LNCS include low- and no-calorie artificial and natural sweeteners that are used as alternatives to sugars, including sugar alcohols. We do not support replacement of added sugars with LNCS, particularly in foods and beverages consumed by children, and we urge FDA to address safety and transparency concerns proactively (see Recommendation 5). What is ultimately needed are actions to reduce exposure to added sugars and increase unsweetened alternatives in the food supply. Therefore, throughout our comment we have incorporated recommendations related to LNCS in addition to added sugars.

In this comment, we specifically address added sugars in beverages with five key recommendations for agency actions to reduce consumption of added sugars across the U.S. population:

1. **Encourage consumption of water instead of sugary drinks [HHS, FDA, USDA]**

2. **Use federal procurement strategies to reduce consumption of beverages high in added sugars and increase water consumption [all federal agencies]**
3. **Mandate interpretive, nutrient-specific front-of-package nutrition labels for packaged foods and beverages [FDA]**
4. **Regulate health-related marketing claims on foods and beverages high in added sugars [FDA, USDA]**
5. **Address concerns about safety of and lack of transparency around foods and beverages containing low- and no-calorie sweeteners [FDA, USDA]**

We also wish to note our strong support for actions that other stakeholders can take to reduce consumption of added sugars in beverages:

6. **Implement sugary drink excise taxes [Congress, states, and localities]**
7. **Pass innovative healthy retail policies to decrease promotion of high-added-sugar foods and beverages and increase promotion of healthier products [states and localities]**
8. **Use procurement strategies to reduce consumption of beverages high in added sugars and to increase water consumption [Institutions, states, and localities]**

Background and rationale

The average American consumes 17 teaspoons of added sugars per day (13% of total daily calories),[1,2] which is over 30% more added sugars than recommended by the Dietary Guidelines for Americans for a healthy diet.[3]

Extensive science shows that excess consumption of added sugars is a risk factor for many diet-related chronic diseases, and further that, independent of calories, added sugars have detrimental metabolic effects that are not due to weight gain and occur even in the absence of weight gain.[4,5] Detrimental effects include but are not limited to:

- Metabolic diseases including type 2 diabetes and fatty liver disease[6,7,8]
    - Non-alcoholic fatty liver disease is also rising among children.[9]
- Cardiovascular diseases[10,11,12]
    - Even children can develop dyslipidemia and hypertension.[13]
- Dental decay[14,15]
    - Tooth decay is one of the most common chronic diseases of children and adolescents[16]
- Obesity[17,18]
    - The 2015 Dietary Guidelines Advisory Committee stated, "Strong and consistent evidence shows that intake of added sugars from food and/or sugar-sweetened beverages are associated with excess body weight in children and adults. The reduction of added sugars and sugar-sweetened beverages in the diet reduces body mass index (BMI) in both children and adults."[19]

These diet-related chronic conditions are also rife with racial and ethnic disparities[20,21, 22,23,24] and can exacerbate economic inequities in the U.S.[25]

The Consortium works to reduce consumption of sugary drinks as a crucial strategy for lowering overall intake of added sugars because sugary drinks are the largest single source of added sugars in the

American diet; they are also among the top source of calories for US children and youth.[26,27,28] Not only are these typically "empty" calories, but they also often displace more nutritious items.[29] Researchers at UC San Francisco estimated that cutting less than one average cola drink a day (a net reduction of 166 kcal/day) would have enabled young adults (aged 20-39) to meet the Healthy People 2020 obesity objective.[30]

Effectively addressing sugary drink consumption requires not only active efforts to discourage it but also parallel initiatives to encourage and facilitate access to safe and appealing drinking water. Drinking plain water in place of sugary drinks is a simple, low-cost, and feasible means of reducing intake of added sugars among both children and adults, and can mitigate risks of chronic diseases.[31,32,33,34,35] Research shows that implementing policies, systems changes, and altering environments to support increased availability of safe and enticing drinking water along with educational initiatives to encourage drinking water instead of sugary drinks can foster healthier hydration habits and significantly impact health.[36,37,38,39]

Recommendations

Our recommendations follow:

1. Encourage consumption of water instead of sugary drinks [HHS, FDA, USDA]

USDA, HHS, and FDA can use a variety of tools—including education, communication, accessibility, and safety measures—to elevate drinking water as a preferable alternative to sugary drinks. Federal agencies should:

a. Take the necessary steps to add a symbol for drinking water to the MyPlate graphic and intensify water promotion messaging in all consumer-facing materials.

Many in the general public are unaware of the high level of added sugars and calories they consume each day while quenching their thirst with SSBs.[40] In addition, many are unfamiliar with the importance of water and lack an understanding of the factors mediating the amount of water required by an individual on any given day.[41] MyPlate is ubiquitous as a foundation for nutrition education in clinics, schools, WIC, SNAP-Ed, EFNEP, and other public health programs. Inclusion of water on the graphic could raise awareness of the benefits of drinking water among those segments of the population that are most vulnerable to over-consumption of SSBs, including young people to whom SSBs are heavily marketed.[42,43] Adding a symbol for water to the MyPlate graphic (not to replace the dairy icon) would support other strategies designed to decrease SSB consumption.[44] This recommendation has been widely endorsed, including by the National Clinical Care Commission, [45] and by leading public health professionals and organizations in letters on this issue submitted to the Dietary Guidelines Advisory Committees of 2014[46] and 2020[47] and to USDA and HHS in 2020.[48] Sixty-nine members of Congress sent a letter to USDA and HHS making this request in 2019.[49] The U.S. should catch up and join the nearly fifty countries around the world that feature "water" in their graphic nutrition guidance.[50]

b. Improve drinking water safety and access for schools and childcare participating in federal child nutrition programs by enhancing existing practices.

We recommend the following three actions in this area:

Enhance Administrative Review of School Nutrition Programs (NSLP, SBP, SFSP, CACFP Afterschool Snack/Supper) to improve drinking water access.[51,52] National School Lunch Program regulations call for on-site Administrative Review (AR).[53] AR Food Safety compliance includes review of nine requirements. The instruction for water says only, "The SA's responsibility is to determine whether free potable water is available at each school selected for review during the lunch and breakfast meal services on the day of review."[54] On-site AR procedures should be revised to provide instruction to ascertain that students have effective access[55] to "free potable water...available for consumption." Procedures to add include assuring that:

- Water source meets standards for accessibility and maintenance
- Water source has adequate and appropriate water flow or water level
- Water source meets required federal and state water safety regulations
- Refillable water bottles are permitted and/or cups are provided
- Promotional/educational material for drinking water are placed near drinking water sources

Enhance "monitoring" in the Child and Adult Care Food Program (CACFP) to improve drinking water access.[56,57] The CACFP's drinking water provisions are excellent, but USDA should ensure that monitoring guidance and technical assistance are provided to ascertain compliance with all provisions for access, including USDA guidance specifying "throughout the day" and "offer and serve."[58] The CACFP monitoring handbook does not mention water[59] and should include checkpoints similar to those recommended for AR. It should be noted that tap water safety is of particular importance for infants whose formula is reconstituted with tap water.[60]

Boost the strength and comprehensiveness of Local School Wellness Policy (LSWP).[61] LSWP is required under the Healthy, Hunger-Free Kids Act of 2010 for schools participating in the National School Lunch Program.[62] USDA should work with partners (EPA, CDC Nutrition and Obesity Policy Research and Evaluation Network (NOPREN)[63] Drinking Water Work Group,[64] Alliance for a Healthier Generation, and National School Boards Association) to develop and promulgate model policy for drinking water that addresses tap water safety, access and promotion.

c. Utilize SNAP-Ed, Head Start, WIC, and home visiting programs to encourage water intake while discouraging consumption of sugary drinks.

USDA and HHS, in collaboration with other appropriate stakeholders, should develop and disseminate a nutrition education component on the basics of tap water safety and healthy hydration habits (including the health, environmental, and equity benefits of tap water) for the Special Supplemental Nutrition Program for Women, Infants and Children (WIC)[65] and for the Head Start program. USDA should add a requirement that all state SNAP-Ed programs include a healthy beverage component consisting of education, policy, systems, and environmental change strategies, all aimed both at reducing sugary drink intake and at enabling consumption of water (preferably tap water).[66] The State of California has instituted these components in its SNAP-Ed program through the California Department of Public Health's role in SNAP-Ed implementation. The current funding guidance that CDPH provides to the 60 local health departments it funds calls out a requirement to include beverage consumption considerations in all PSE work and lists changing sugary drink consumption as the core behavioral change strategy for the funding.[67]

2. Use federal procurement strategies to reduce consumption of beverages high in added sugars and increase water consumption [all federal agencies]

We urge federal agencies to develop and implement and/or strengthen policies and guidelines to eliminate or restrict access to sugary drinks on their properties and in their funded programs. All agencies should also increase access to free, potable, and appealing sources of drinking water for their employees and visitors.[68] Such procurement strategies are already in use at some state, tribal, regional, or local levels and should be widely adopted. Specific recommendations include:

a. Eliminate sales and serving of sugary drinks on all federal properties and in all federally funded programs or events.

Two U.S. cities that have undertaken such an action are San Francisco, CA and Berkeley, CA. In 2010, the city of San Francisco issued an executive order, later converted to an ordinance, restricting the purchase, sale, or distribution of sugar-sweetened beverages by or for the city.[69] In 2022, the city of Berkeley amended a 2018 ordinance that prohibited the purchase of SSBs using city funds and prohibited the sale of SSBs on city properties, adding a prohibition on the serving of SSBs on city properties.[70] To support blind vendors operating facilities through the Randolph Sheppard Act (RSA) and similar state laws, this elimination could be accomplished through a phase out that includes increased support and technical assistance to RSA vendors to implement changes and maintain successful operations.

Should this recommendation not be adopted, we recommend the following actions:

b. Eliminate all sales and serving of sugary drinks in all federally funded healthcare facilities.

Federally funded healthcare facilities, including the Veteran Health Administration (Department of Veterans Affairs), the Military Health System (Department of Defense), and Federally Qualified Health Centers (Health Resources and Services Administration), should not serve or sell SSBs (excepting in cases of clinician-prescribed beverages). Several hospital systems in the U.S. have implemented such a policy, eliminating all SSBs, including in hospital cafeterias, patient meals and other sales points.[71,72] A study from the University of California, San Francisco found that ten months after a sugary drink sales ban in all UCSF workplace locations, staff had significant decrease in sugary drink intake and significant improvement in health outcomes (waist circumference and health biomarkers).[73]

c. Implement CDC's Food Service Guidelines for Federal Facilities in all other relevant facilities.

Any federal agencies that have not eliminated SSB sales and serving should at a minimum implement the Food Service Guidelines for Federal Facilities—as called for in the Biden-Harris Administration National Strategy on Hunger, Nutrition, and Health[74]—and provide incentives for facilities to move beyond the standard guidelines to the "Innovative" level for food categories that include added sugars (e.g., the "Beverages" category).[75] Agencies should also consider alternate procurement scoring systems, such as the Good Food Purchasing Program: Purchasing Standards for Food Service Institutions,[76] which support five core values: nutrition, local economies, environmental sustainability, valued workforce, and animal welfare. A host of jurisdictions have implemented SSB service restrictions, including state agencies in Massachusetts[77] and Washington State.[78,79]

d. Adopt and implement single-use plastics reduction policies to discourage sugary drink consumption and protect the environment.

All federal agencies should restrict sugary drink sales to beverage dispensers only, with recyclable/compostable cups provided and reusable bottles encouraged (i.e., no single-serve

containers). For example, in 2022 the Secretary of the Interior released ORDER NO. 3407, a "Department-Wide Approach to Reducing Plastic Pollution," aiming to eliminate all single-use plastic packaging including all single-use beverage bottles.[80] It should be noted that when University of Vermont banned only bottled water, the strategy backfired and students purchased more sugary drinks.[81]

3. Mandate interpretive, nutrient-specific front-of-package nutrition labels for packaged foods and beverages [FDA]

Current U.S. food labeling requirements (i.e., the Nutrition Facts label) and voluntary industry initiatives (e.g, Facts Up Front[82]) are insufficient to help consumers reduce their added sugars consumption. Only 41% of people report using the Nutrition Facts panel always or most of the time when deciding to buy a food product,[83] and experimental studies have found that Facts Up Front-style labels do not improve the overall healthfulness of consumers' food choices compared to a no-label control.[84,85,86] Many countries, including Canada and Mexico, require simple front-of-package nutrition labels to help consumers quickly and easily identify foods and beverages that are high in sugars as well as saturated fat and sodium.[87,88,89] In addition to helping consumers understand the added sugars content of the foods they buy, such labels can encourage companies to reduce added sugars in their products; after Chile's adoption of a mandatory front-of-package nutrition labeling policy in 2016, there was a 10% decrease in sugar purchased per person per day[90] and a 15% decrease in the proportion of commonly consumed packaged foods that qualified for a "high in sugars" label.[91] Polling shows that Americans want front-of-package nutrition labels too, with 75% responding that they would support a policy requiring labels like these in the United States, including majorities of Democrats (83%), Republicans (68%), and Independents (73%).[92]

FDA should issue regulations adopting mandatory front-of-package nutrition labels for packaged foods and beverages that highlight when foods are high in added sugars, among other nutrients of concern. CSPI, the Association of State Public Health Nutritionists, and the Association of SNAP Nutrition Education Administrators previously submitted a citizen petition requesting this action in August of 2022,[93] and we appreciate that FDA is already hard at work researching and developing a front-of-package nutrition label for the U.S. food supply. We are also happy to see interest from Congress with the December 2023 introduction of the TRUTH in Labeling Act of 2023 (S.3512/H.R.6766), which would amend the Federal Food, Drug, and Cosmetic Act to require standardized, interpretive nutrition labels on the front of food packages.[94] We support FDA's work and encourage the agency to move swiftly to issue a proposed rule. As the agency drafts a proposed rule, we encourage FDA to:

- **Make the policy mandatory.** This is the only way to ensure labels will appear on all foods and beverages high in added sugars. Voluntary front-of-package nutrition labeling policies may have inconsistent uptake by food manufacturers, and companies may selectively apply labels to products that will look more appealing with the label. For example, five years after Australia's adoption of a voluntary front-of-package nutrition labeling policy in 2014, the voluntary health star rating label appeared on less than half of eligible products (41%), and those products were more nutritious compared to products not displaying the label.[95]

- **Make the labels interpretive and nutrient-specific,** indicating when a product is high in added sugars as opposed to providing numeric content, such as grams of added sugars and Percent Daily Values (DVs). FDA surveys show that 37% of people are unable to accurately interpret the Percent DV, with lower utilization and understanding among groups with lower educational

attainment.[96] Interpretive labels are well-suited to consumer tendencies to rely on heuristic cues to evaluate the nutritional quality of foods,[97] and researchers have suggested that they may also be easier to understand by youth and people with less education, lower literacy or numeracy, and limited English.[98]

- **Make the labels simple and eye-catching.** Labels need to be useful for people of all ages and backgrounds, and stand out against other information on the package. Icons (e.g., an exclamation point) should be used to draw attention to the labels. Use of icons could additionally facilitate better comprehension among those with lower literacy[99] and improved effectiveness, especially among populations with limited English proficiency.[100]

- **Require the labels to appear prominently at any point of sale, whether on the package or online.** Given the rise in online food shopping—in 2020, 29% of U.S. households were active monthly users of online grocery platforms[101]—it is important that any labels mandated on the front-of-package are similarly prominent when products are sold online.

- **Move expeditiously and prioritize public health over private industry interests.** The Department of Health and Human Service's (HHS's) Fall 2023 Unified Agenda of Regulatory Actions stated that FDA would issue a notice of proposed rulemaking on front-of-package nutrition labeling in December 2023, but the Unified Agenda published in December delays the proposed rulemaking to June 2024.[102] We urge FDA not to further delay its timeline and to issue a proposed rule by June 1, 2024.

  As FDA considers front-of-package labels for foods high in added sugars, it should also pursue separate regulations requiring LNCS disclosures like "sweetened with [LNCS], a low-/no-calorie sweetener" or "contains [LNCS] as a low-/no-calorie sweetener", especially on products making claims about healthfulness or low/no/reduced sugar content. We recommend consumer testing of the various terms used to describe these sweeteners, such as LNCS, high intensity sweeteners, non-sugar sweeteners, non-nutritive sweeteners, and others, to determine the term that consumers would best understand. See Recommendation 5 for more information.

4. Regulate health-related marketing claims on foods and beverages high in added sugars [FDA, USDA]

Marketing claims suggesting that products are healthy and natural are common in the U.S. food supply, including on products with added sugars. Nearly 17% of all foods purchased in 2018 were labeled as "natural," with even higher rates on breakfast cereals (28%) and desserts, sweets, and candies (21%).[103] Additionally, claims are highly prevalent on fruit drinks (i.e., sweetened fruit-flavored drinks with less than 100% juice),[104,105] the most common type of sugar-sweetened beverage consumed by young children.[106,107] For example, two separate content analyses found that nearly all fruit drinks purchased by households with young children displayed one or more claim such as "all natural" or "100% vitamin C" despite containing upwards of 30 grams of added sugar (more than half a day's worth).[108,109]

Studies demonstrate that the presence of marketing claims on sugary foods/drinks affects purchases, steering people towards more sugary products.[110,111] One experimental study found that the presence of marketing claims led parents to choose a sugar-sweetened fruit drink instead of 100% juice for their young child.[112] Another randomized trial found that claims and fruit imagery on drink packaging

increased the proportion of parents choosing beverages high in added sugar for their children by 7.6 percentage points.[113]

Marketing claims can also affect consumer perceptions of products. For instance, claims indicating that a product is healthy can produce "health halo" effects, in which consumers overgeneralize positive qualities of a product beyond the focus of the claim itself. A recent trial with parents of young children (ages 1-5 years), for example, assessed beliefs about two identical sugar-sweetened fruit drinks: one with and one without claims.[114] Parents who viewed a drink with a "100% all natural" claim were 4 times as likely to incorrectly believe that the drink did not contain any added sugar, compared to parents who saw the drink with no claim (47% vs. 12%).[115] The "100% all natural" claim also made parents think the sugary drink was healthier for their young child than the identical drink without a claim.[116] Similarly, a second study found that 76% of parents viewing a sugar-sweetened fruit drink with a "natural" claim incorrectly thought there was no added sugar in the drink, compared with only 37% who viewed the same drink without the claim.[117] Two additional experiments have also found that "natural" claims make people believe that potato chips and sugary drinks are lower in calories[118,119] and fat[120] than they really are. Likewise, an experiment found that health-related claims on toddler milks (i.e., a powdered milk-based product that often contains added sugar) led parents to believe toddler milk was healthier than when it had a non-health-related claim.[121]

Regulating the use of marketing claims on products high in added sugar could protect consumers and ultimately improve public health. Both FDA and the U.S. Department of Agriculture (USDA) have the regulatory authority and responsibility to act. Recommendations for regulatory action include:

a. **Establish disqualifying levels of added sugars for foods and beverages making certain types of marketing claims.** FDA has already set disqualifying levels of fat, cholesterol, and sodium above which foods are not permitted to make health claims. While such levels are authorized by statute, the agency could take similar actions for added sugars in products making other types of claims that are evidenced to deceive consumers about the healthfulness or sugar content of certain foods, based on FDA's authority to prevent false or misleading labeling.

b. **Formalize the definition of and regulate "natural" claims.** Given that the term "natural" is only loosely and informally regulated,[122] FDA and USDA could create and formalize a definition of "natural" and crack down on companies that misuse the term. For example, "natural" could be prohibited on products that meet existing definitions of being high in added sugars or on products that do not meet FDA's forthcoming definition of "healthy."

c. **Require that fruit drink labels state up front how much (or little) juice is in the product.** Fruit drinks are already required to declare the percent juice content near their Nutrition Facts labels, but less than half of consumers report regular use of the Nutrition Facts label when deciding whether to buy a food product and presumably even fewer notice the percent juice declaration.[123] Prominent front-of-package "percent juice" disclosures on fruit drink labels could prevent consumers from being misled to believe that fruit drinks are 100% fruit juice or contain no added sugars. Products making fruit/juice claims should be required to disclose percent juice content on the front of package if juice content is below a minimum level.

d. **Fund and disseminate campaigns to inform consumers.** In light of the potentially deceptive nature of certain claims on products that are high in added sugars, health communication campaigns can help prevent deception and inform consumers about how to interpret marketing

claims with caution. Counter-marketing communications strategies are especially promising; these approaches expose the motives of and de-normalize marketing activities, including the use of deceptive claims.[124,125,126]

5. Address concerns about safety of and lack of transparency around foods and beverages containing low- and no-calorie sweeteners [FDA, USDA]

We want to call attention to an important unintended consequence of reducing added sugars in the food supply. As industry responds to policies aimed at reducing added sugars and consumers demand lower sugar products, it is *reducing* added sugars while *increasing* use of low- and no-calorie sweeteners (LNCS) to maintain product palatability.

Industry is substituting LNCS for added sugars. When policies induce industry to reduce the added sugars content of their products, manufacturers often respond by adding LNCS. Chile's 2016 Law of Food Labeling and Advertising requires front-of-package added sugar warning labels, restricts marketing of products high in added sugars to children, and bans sales of products with excessive added sugars in schools.[127] After the law's implementation, the proportion of foods and beverages with LNCS, purchases of LNCS-containing products, and LNCS consumption increased, including among children.[128] The adoption of the sugary drinks industry levy in the UK, which taxed drinks with higher sugar levels, resulted in reformulation of many products to reduce their sugar content to below the taxed levels.[129,130] However, as Rogers, et al. note, "It is likely that the reformulation that has occurred in response to the [sugary drinks industry levy] reflects substantial increases in the use of artificial sweeteners in the UK soft drinks market."[131]

LNCS use is common and increasing. Globally, LNCS use in beverages and packaged food is increasing.[132] Use of LNCS is now widespread and increasing in the U.S. food supply.[133] A recent survey of over 80,000 products found that more and more foods and beverages contain LNCS. Between 2013-2022, the number of products with synthetic sweeteners increased 3-8 fold in products including beverages, cereals, dairy and frozen foods.[134] LNCS are also commonly found in products marketed to children (e.g., 70% of beverages, primarily fruit drinks, contain LNCS) and a fifth of children age 2-5 years old consume products with LNCS (as of 2012—the prevalence is likely higher now).[135,136]

In particular, the use of plant-derived LNCS (e.g., stevia and monk fruit) is increasing, and industry markets them as a healthy, natural alternative to traditional LNCS like aspartame, sucralose, and acesulfame-potassium.[137] Stevia and monk fruit came to market through the "generally recognized as safe" (GRAS) loophole, a process by which industry can bypass the FDA approval process for new food additives by claiming the substance is GRAS. Industry can voluntarily notify FDA of their GRAS determinations, but FDA does not approve them; there have been 41 voluntary GRAS notifications for stevia and 4 for monk fruit. Although FDA raised no questions regarding industry's GRAS determinations for stevia and monk fruit, concerns remain. Monk fruit has not been adequately tested in animals for safety,[138] little is known about the effects of stevia and monk fruit on human diet, weight, and health, and no studies are available in children. It is therefore unclear if these "natural" LNCS are favorable relative to traditional LNCS, so the term "natural" should not be equated with "healthy."[139]

Evidence for harm from some LNCS is increasing. Given that each LNCS is a different chemical, it is important to consider their safety individually while also considering potential class effects on human health. Certain LNCS have been linked to increased risks of various cancers and endocrine disruption, including aspartame,[140] acesulfame potassium,[141] saccharin,[142] and sucralose.[143] Randomized controlled

trials further provide evidence that saccharin can alter gut microbiota in humans,[144,145] and that aspartame, stevia, and sucralose can alter gut microbiota in some, but not all, humans.[146] RCTs in humans have also shown plausible biological mechanisms linking saccharin and sucralose to decreased insulin sensitivity and increased risk of diabetes.[147,148,149,150] Long-term prospective cohort studies additionally report associations between consumption of LNCS-containing beverages and obesity, type 2 diabetes, cardiovascular disease, cancer, and all-cause mortality.[151, 152, 153, 154, 155, 156, 157, 158, 159, 160] These findings, however, may be limited by residual confounding and reverse causality as well as difficulty in accurately measuring exposure to and effects from specific LNCS.

In addition to specific effects associated with each individual LNCS, there also may be class effects on health outcomes common to all LNCS. All LNCS are potently sweet, activate sweet taste receptors, and are often consumed in combination. Several potently sweet LNCS, including sucralose, acesulfame-potassium, and saccharin, have been shown to activate sweet taste receptors and induce insulin secretion in vitro, which suggests that the intense sweetness of certain LNCS may define a set of LNCS that have similar metabolic effects, despite being a heterogeneous group of compounds.[161] It has also been speculated that LNCS consumption in early childhood may set preferences for sweeter foods later in life,[162] which could affect long-term health.

a. FDA should closely monitor the use and safety of low- and no-calorie sweeteners in the U.S. food supply.

It is practically impossible to estimate the total content of different LNCS in foods and beverages, as the food industry is not required to disclose the content of LNCS in their products. Researchers typically are limited to evaluating LNCS consumption based only on the presence or absence of LNCS in products, which is an imprecise measure. Other barriers to conducting research on LNCS include lack of data on exposure to specific LNCS, inaccuracy of consumer dietary recall to assess consumption, and lack of validated food frequency questionnaires to measure LNCS.[163] FDA has the authority to reassess the safety of chemicals at any point, but is not obligated to do so with any regularity. To adequately monitor the use and safety of LNCS in the U.S. food supply, Congress should ensure that FDA has the authority to collect data on the production and use of LNCS (see Recommendation 14). Meanwhile, FDA must encourage the food industry to disclose the LNCS content of their products.

We recommend FDA quantitatively monitor the use of all LNCS in foods and beverages in the U.S. The agency should make this data publicly available to allow the government and outside researchers to track use and evaluate safety over time. For example, it is mandatory to declare the presence and amounts of LNCS in packaged products in Chile,[164] which has allowed researchers to quantify increases in LNCS intake and purchases after the Chilean law was implemented.

We also recommend that FDA re-evaluate the safety of LNCS for which evidence of harm has recently emerged, and routinely re-evaluate the safety of those for which use is found to have increased from previous exposure estimates. A recent HHS report to Congress on sugar substitutes recommended that FDA update and refine dietary exposure estimates for U.S. children's consumption of LNCS.[165] **We encourage FDA to update these exposure estimates and extend them to the entire population (i.e., also include adults).**

Further, because the GRAS exemption is a process rife with industry conflicts of interest, **FDA should identify the LNCS that are not covered by a GRAS notice and subsequent "no questions letter" and**

review the published safety data for such products, encouraging companies to submit such a GRAS notice if data supporting safety appear to be inadequate.

b. FDA and USDA should make special efforts to reduce exposure to LNCS among children.

LNCS are not recommended for young children because long-term health effects associated with consumption in childhood are still unknown, and it has been suggested that early exposure to LNCS may predispose children to prefer higher levels of sweetness in the diet and unfavorably influence their future dietary patterns.[166,167,168,169,170] The lack of data on health effects of LNCS on children is a concern, given the potential for varying effects across developmental stages and the potential risks of chronic exposure over a lifetime. Exposure may begin before birth through transplacental fetal exposure.[171] In animal studies, in utero exposures to aspartame elevated the risk of cancer to a greater degree than when exposures begin in adulthood.[172,173] Infants may be exposed through intake of breast milk,[174] and children through the foods and beverages served to them. Another consideration is that although replacing added sugar with LNCS reduces sugar and calories, the sweetness of the product is maintained or even increased. Sweetness increases product palatability, which is a well-documented driver of food purchases and energy intake. Given the uncertainty of benefit and potential for harm, it is appropriate to use caution; we believe it is prudent for children to avoid prolonged consumption of foods and beverages sweetened with LNCS.

We propose that the FDA restrict LNCS in food categories commonly consumed by children and products marketed to children until long-term evidence of safety is available.

We also urge USDA to disallow products containing LNCS as part of their added sugars standards for school meals, competitive foods, and CACFP (in child-specific programs).

c. FDA should consider disclosures and more ingredient information on products that contain low- and no-calorie sweeteners to alleviate consumer confusion.

Another concern is the challenge consumers face in accurately identifying products that contain LNCS. Research has shown that many U.S. parents try to avoid purchasing products sweetened with LNCS for their children, but are largely unsuccessful due to confusing product labels. In one simulated shopping study in a supermarket, parents indicated that they avoided LNCS for their children, but they failed to identify the majority (77%) of the foods and beverages that contained LNCS, and roughly one quarter of the foods and beverages they selected for their family contained LNCS.[175] Similarly, the majority of parents in another study (62%) could not identify beverages with LNCS, even when shown the ingredients lists.[176] This likely is because many parents may not read the ingredients list due to its fine print and placement on the back of packages, or they may be unable to interpret which ingredients in the ingredients list are LNCS.[177] Recognizing the importance of transparency to inform consumers, other countries, including Mexico, and Argentina, require black box warnings on the front of packages that state "Contains sweeteners – not recommended for children" if a product contains LNCS (a third country, Columbia, limits its label to "contains sweeteners").

As FDA considers front-of-package labels for foods high in added sugars, it should also consider separate regulations requiring LNCS disclosures like "sweetened with [LNCS], a low-/no-calorie sweetener" or "contains [LNCS] as a low-/no-calorie sweetener", especially on products making claims about healthfulness or low/no/reduced sugar content. We recommend consumer testing of the various terms used to describe these sweeteners, such as LNCS, high intensity sweeteners, non-sugar

sweeteners, non-nutritive sweeteners, and others, to determine the term that consumers would best understand.

Additionally, **amounts of each individual LNCS per serving should be disclosed on food and beverage packaging**, as recommended by the American Academy of Pediatrics[178] and as Chile has already done.[179] This information will be useful both to consumers who want to know more about the LNCS content of foods they purchase and to researchers seeking data on LNCS content.

In summary, we recommend that, with regard to Low and No Calorie Sweeteners (LNCS):

- **FDA quantitatively monitor the use of all LNCS in foods and beverages in the U.S., and make this data publicly available to allow the government and outside researchers to track use and evaluate safety over time.**
- **FDA re-evaluate the safety of LNCS for which evidence of harm has recently emerged, and routinely re-evaluate the safety of those for which use is found to have increased from previous exposure estimates.**
- **FDA identify the LNCS that are not covered by a GRAS notice and subsequent "no questions letter" and review the published safety data for such products, encouraging companies to submit such a GRAS notice if data supporting safety appear to be inadequate.**
- **FDA restrict LNCS in food categories commonly consumed by children and products marketed to children until long-term evidence of safety is available.**
- **USDA disallow products containing LNCS as part of their added sugars standards for school meals, competitive foods, and CACFP** (in child-specific programs).
- **FDA consider regulations requiring LNCS disclosures like "sweetened with [LNCS], a low-/no-calorie sweetener" or "contains [LNCS] as a low-/no-calorie sweetener", especially on products making claims about healthfulness or low/no/reduced sugar content.**
- **FDA require amounts of each individual LNCS per serving to be disclosed on food and beverage packaging.**

As we make progress in addressing the harms of excessive added sugars consumption, it is critical that we also avoid the potential for unintended adverse consequences of exposure to LNCS.

University of California Research Consortium on Beverages and Health Recommendations for Actions That Other Stakeholders Can Take to Reduce Consumption of Added Sugars in Beverages

6. Implement sugary drink excise taxes [Congress, states, and localities]

Taxing sugar-sweetened beverages (SSBs) is a highly effective, evidence-based intervention for reducing sales of these products. In addition, reduced sales likely contributes to improved health outcomes, such as better oral health and lower rates of weight gain and obesity. Taxes can signal that SSB consumption is unhealthy, raise revenues to support valuable programs and services such as early childhood education and healthy food subsidies, and induce reformulation of beverages to reduce added sugars content.[180] Implementation of SSB taxes is expanding rapidly across the world. Globally, 132 jurisdictions have imposed taxes, including 8 cities and counties in the U.S. (one of which was subsequently repealed). These taxes cover 57% of the world's population.[181] The World Health Organization recommends that governments adopt SSB taxes to reduce consumption and advance health.[182]

SSBs are the largest source of added sugars in the American diet.[183] Consumption of SSBs is associated with risk for weight gain, obesity, type 2 diabetes, cardiovascular disease, tooth decay, and all-cause mortality.[184, 185, 186, 187, 188, 189] Reducing SSB consumption is thus a key strategy for reducing added sugars consumption and preventing the adverse health effects of excessive added sugars intake.

Strong evidence shows that SSB taxes are associated with higher prices and decreased purchases of taxed beverages. A systematic review and meta-analysis by Andreyeva and colleagues found that 82% of the tax was passed through to prices (95% CI 66.2, 98.3, p<0.001). Sales decreased on average by 15% (95% CI −20.4, −8.8, p<0.001), with a price elasticity of −1.59. [190] A meta-analysis of U.S. taxes had similar findings. Taxes were associated with a 20% decrease in demand, corresponding to a price elasticity of -1.5. After accounting for cross-border shopping, elasticity of demand was -1.1.[191] Kaplan et al, using a cross-sectional study design with an augmented synthetic control analysis that pooled data from five U.S. cities with taxes, found that the volume of SSB purchases declined by 33% following tax implementation.[192] Evaluations of taxes in Berkeley, CA;[193] Philadelphia, PA;[194,195] Seattle, WA;[196] Cook County, IL;[197] and Oakland, CA[198,199] all reported significant post-tax implementation declines in sales. Taxes also decrease purchases of added sugars.[200,201]

Fewer available studies have assessed consumption, and measures of consumption are less precise than those of purchases. Andreyeva et al. found that taxes were associated with a close to significant 18% decrease in consumption (95% CI -37.6%, 1.5%, p=0.07).[202] A recent large U.S. study of 86,928 adolescents reported a decrease of 0.81 servings per week after Philadelphia implemented its tax (−15% from baseline consumption).[203] Consumption in Berkeley declined during the three years following tax implementation.[204]

SSB taxes induce industry to reduce added sugars in beverage products to avoid taxes.[205] While this advances the goal of added sugars reduction, unintended consequences must also be considered. When beverage manufacturers reduce sugar in their products, they often add LNCS, some of which are associated with safety concerns (see Recommendation 5). This suggests that a tax on all sweetened beverages—those with only sugar as a sweetener as well as those with LNCS—may be beneficial. Indeed, 76% of taxes globally include diet beverages.[206]

In the U.S., tax revenues are used to advance community health and well-being. Investments should and in most instances have been targeted to benefit low-income communities and have included early childhood education programs, community infrastructure (e.g., parks, libraries), workforce development, and fruit and vegetable subsidies.[207] Importantly, taxes with revenue investments directed towards low-income communities can provide greater benefits to people with low incomes relative to people with higher incomes. A study of the economic benefits and costs of taxes stratified by household income showed that while lower income populations paid a higher percentage of their income in beverage taxes, there was no difference across income groups in taxes paid per capita. The investment of tax revenues in lower-income communities was greater than the amount these communities paid in taxes. The opposite was true for higher income communities. The annual net benefit to lower-income communities ranged from $5.3 million to $16.4 million across the three U.S. cities included in the study.[208]

Evidence regarding the health benefits of SSB taxes is emerging and promising. The Philadelphia beverage tax was not associated with reduced tooth decay in the general population, but was associated with reduced tooth decay in adults and children enrolled in Medicaid.[209] A tax in Mexico was associated with a reduction in dental caries and outpatient visits for dental caries.[210] The Mexican tax was also

associated with reductions in the prevalence of overweight and obesity among girls living in cities where the price of SSBs increased by more than ten percent.[211] Identifying associations of taxes with health outcomes is challenging, given the myriad factors that affect health and the long time horizon some outcomes take to develop.[212] Simulation models predict reductions in obesity and health equity.[213]

We recommend that Congress implement a national SSB excise tax. SSB taxes reduce sales, induce product reformulation, signal that these products are unhealthy, and generate revenues to support valuable programs and services. Evidence for health benefits is emerging. The U.S. should catch up with the rest of the world and join the scores of nations that have adopted sweetened beverage taxes. A national tax would be more efficient and effective than a patchwork of local and state taxes. Tax uniformity would prevent tax evasion from cross-border shopping (where consumers purchase beverages in jurisdictions without taxes), simplify administration and compliance, and extend the benefits of taxes to all Americans. **We recommend prompt adoption of a national SSB excise tax in the U.S. Absent a federal tax, local and state jurisdictions should continue to implement SSB excise taxes.**

7. Pass innovative healthy retail policies to decrease promotion of high-added-sugar foods and beverages and increase promotion of healthier products [states and localities]

Price promotions and product placement affect consumer shopping behavior in the food retail environment. For example, a study of 179 supermarkets found that sales were markedly higher for products when they were placed in prominent locations (e.g., checkout, endcaps, themed displays); this was the case for both unhealthy *and* healthy products (e.g., sales of placement-promoted products increased by 35% for baked goods, 29% for SSBs, 41% for vegetables, and 56% for fruit).[214] The increase in sales was even more pronounced when placement-promoted products were also price promoted. [215] Healthy changes to food retail environments have the potential to improve the healthfulness of in-store marketing and consumer purchases. For example, when multiple supermarket chains in the United Kingdom (UK) adopted healthy checkout standards that limited candy and sweets and encouraged products like fruits, nuts, and water at checkout, purchases of unhealthy checkout items (e.g., small packages of candy and chips) decreased by 17%, which was sustained 1 year later.[216]

In March of 2021, the city of Berkeley, CA became the first jurisdiction to implement a healthy checkout policy, which permits only the following foods and beverages in the checkout area of applicable stores: beverages without sweeteners (caloric or noncaloric) and foods with ≤5 g added sugar and ≤200 mg sodium per labeled serving in the following categories: sugar-free gum and mints, fruit, vegetables, nuts, seeds, legumes, yogurt or cheese, and whole grains. The policy applies to all checkouts in large stores (>2,500 sq ft) that sell ≥25 linear feet of food, and applies to the entire checkout area up to an including the endcap.[217] In October of 2022, the UK went even further, implementing regulations that prohibit price promotions and product placement of foods high in added sugars, saturated fat, and sodium at large store checkouts, aisle ends (i.e., endcaps), or separate structures near aisle ends.[218] U.S. states and localities should implement similar nutrition standards for in-store product pricing and placement.

8. Use procurement strategies to reduce consumption of beverages high in added sugars and to increase water consumption [Institutions, states, and localities]

Recommendation 2 highlighted the need for federal agencies to adopt procurement strategies that reduce consumption of beverages high in added sugars and increase water consumption. Institutions, states, and localities throughout the U.S. should adapt and adopt these strategies as well.

Notably, many of our recommendations were also in the National Clinical Care Commission Report to Congress in December 2021, "Leveraging Federal Programs to Prevent and Control Diabetes and Its Complications," [219] and particularly in report Focus Area 4, such as,

> "Recommendation 4.4: The National Clinical Care Commission recommends that all relevant federal agencies promote the consumption of water and reduce the consumption of sugar-sweetened beverages in the U.S. population, and that they employ all the necessary tools to achieve these goals, including education, communication, accessibility, water infrastructure, and sugar-sweetened beverage taxation.
>
> "4.4a. USDA should add a symbol for drinking water to the MyPlate graphic and increase water promotion messaging in all consumer-facing materials issued by its Center for Nutrition Policy Promotion. Water is not currently depicted on the USDA MyPlate.
>
> "4.4b. Child nutrition programs should be a conduit for education to promote consumption of water and reduce consumption of sugar-sweetened beverages. USDA should encourage hydrating with water instead of sugar-sweetened beverages and provide safe water education in WIC nutrition education and in childcare settings. Congress should harness the Child Nutrition Reauthorization Act to strengthen existing water provisions for school nutrition programs.
>
> "4.4f. All federal agencies should promote drinking water and reduce sugar-sweetened beverage consumption within their own organizations and through the grants and programs they fund or administer. All agencies should increase access to free, clean, and appealing sources of drinking water for their employees and visitors and develop procurement and other policies that curb the availability and sale of sugar-sweetened beverages to their employees and visitors.
>
> "4.4g**.** HHS should serve as a federal model by (a) ensuring onsite access to safe, clean, and appealing drinking water; (b) restricting the sale of sugar-sweetened beverages in HHS-owned or HHS-leased offices, workplaces, and health care facilities; and (c) measuring the impact of these interventions on employee behavior and diabetes-related outcomes through voluntary participation in an evaluation of the model."

The University of California Research Consortium on Beverages and Health wishes to register our support for other recommendations submitted by our public health colleagues for critical actions for federal agencies to reduce added sugars consumption across the U.S. population, including:

1. **Update sugars standards for foods and beverages offered through federal nutrition programs in schools and child and adult care settings, and disallow LNCS in child-specific settings [USDA]**
    a. In particular, we ask that federal entities provide strong support for implementation of USDA's proposed new standards for added sugars in school meals, competitive foods and beverages and in CACFP, expected to be released in Spring 2024.
2. **Establish added sugars reduction targets for packaged and restaurant foods and beverages [FDA]**
3. **Adopt strong limits on added sugars in FDA's final rule on "healthy," holding fast to the original proposed limits [FDA]**
4. **Issue guidance encouraging online retailers to provide consumers with access to the same nutrient, ingredient, and allergen information required on food and beverage packages [FDA]**
5. **Mandate added sugars disclosure at restaurants [FDA]**

6. **Require SNAP-authorized retailers to adhere to stocking and marketing guidelines that increase availability, placement, and promotion of DGA-aligned foods [USDA]**
7. **Implement advertising restrictions on products high in added sugars [FTC]**
8. **Publish a Surgeon General's Report or Advisory on the health effects of added sugars and importance of added sugars reduction [HHS]**
9. **Ensure that federal agencies have proper authority and adequate funding to facilitate added sugars reduction [Congress]**

In conclusion, and as highlighted in this comment, there are a great many opportunities for action by federal agencies to reduce added sugars consumption in the U.S. We urge federal agencies to act quickly on these evidence-based recommendations to reduce added sugars in the U.S. food supply and to enable consumers to access the information they need to make healthy choices for themselves and their families. Thank you for this opportunity to provide input and for your consideration of our recommendations. Please contact us if we can provide further information.

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