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# The ethics of excise taxes on sugar-sweetened beverages

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## ABSTRACT

Sugar-sweetened beverage (SSB) taxation has emerged as a priority policy for promoting health and funding investments in communities most affected by diet-related disease. There are now 8 U.S. jurisdictions and over 40 countries that have implemented SSB taxes. Evaluations show that these policies reduce SSB consumption and purchasing while raising revenues to fund public health, education, and equity. However, there have been few analyses of the ethical considerations of SSB taxation. Using a framework for evaluating the ethics of public health interventions, this paper considers the ethical aspects of SSB excise taxes with respect to: physical health, psychosocial well-being, equality, informed choice, liberty, social and cultural values, and responsibility. Available evidence suggests there is a strong ethical case for levying SSB excise taxes on manufacturers and distributors. SSB excise taxes reduce consumption and purchasing of SSBs and are expected to meaningfully reduce obesity and diet-related morbidity and mortality. Because SSB taxes are specific to a product and its manufacturers, they are unlikely to harm psychosocial health by stigmatizing people who are overweight. SSB excise taxes should lead to greater equality because the health and social benefits are progressive (i.e., low-income individuals are likely to accrue the largest benefits from the tax, even more so when revenues are spent on health and social equity). Meanwhile, the average consumer cost burden that would result if distributors raise SSB prices in response to the tax is minimally regressive. Regarding liberty, SSB taxes do not eliminate the option of buying SSBs, but if SSB distributors raise SSB prices, it becomes somewhat more expensive to continue purchasing the same amount of SSBs. Meanwhile, the taxes expand beverage options by funding drinking water availability and prompting industry to expand offerings of unsweetened drinks and SSBs containing less sugar. Furthermore, by averting poor health, SSB taxes should expand overall freedom to pursue one's goals. Informed choice could be facilitated by seeing a higher SSB shelf price (which indicates a drink contains added sugar) and exposure to nutrition education funded with tax revenues. SSB taxation is unlikely to negatively interfere with social or cultural values because taxation would not eliminate having SSBs for special occasions, and SSBs are not a staple of traditional diets. Lastly, SSB taxation attributes responsibility for health in a manner that reflects industry's contribution to obesity and the multisectoral solutions that are needed to prevent diet-related disease.

## 1. Introduction

Sugar-sweetened beverage (SSB) consumption is responsible for an estimated 184,000 deaths per year worldwide from obesity, obesity-related cancers, diabetes, and cardiovascular disease. [1] Taxation of SSBs has emerged as a global strategy [2] to improve public health by reducing consumption of SSBs and generating revenue [3,4] for public health and health equity programs, including those that address the social determinants of health (e.g., early care and education). SSB taxation as a public health strategy has its origins in the prior success of taxation for tobacco control [5] and calls to better fund disease prevention. [6] To exemplify the latter, Jacobson and Brownell [6] noted that government spending to promote healthy diets was “negligible” and dwarfed by spending on soft drink ads. This imbalance, they

argued, could be ameliorated in part by funding prevention efforts with small taxes on SSBs. [6]

Although taxing soda is not a new concept (39 U.S. states taxed soda as of 2014) [7], implementing taxes on SSBs with the explicit intent of improving public health is a recent occurrence. U.S. soda taxes implemented before 2014 consisted mainly of sales taxes; [8] whereas the new generation of public health SSB taxes are typically excise taxes levied on distributors. In 2014, Mexico set off a wave of these new SSB taxes in the U.S. and globally when it implemented a 1-peso-per-liter excise tax on SSBs. Now, 8 U.S. jurisdictions and over 40 countries have implemented SSB taxes. [9] To date, these taxes have reduced consumption or purchasing of taxed beverages [10–17] and have funded public health, education, and equity programs, such as installation of clean drinking water in public schools, food security programs during

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the COVID-19 pandemic, healthy retail in low-income neighborhoods, and free prekindergarten for low-income families. [18–21]

SSB taxes have been endorsed by the World Health Organization, [2] American Heart Association (AHA), American Academy of Pediatrics, [22] and other prominent health organizations. However, SSB taxes have also been controversial and failed to pass in many jurisdictions. The most vocal opposition has come from the beverage industry. Many of the arguments for and against SSB taxes are ethical arguments, yet there have been few analyses of the ethical implications of SSB taxation. [23,24] The ethics of any policy are critical for voters, policymakers, public health practitioners, and policy implementors to weigh. This paper considers the ethical implications of SSB taxes.

## 2. Ethical implications of SSB excise taxes

One of the key rationales for SSB taxes is that SSB consumption contributes to obesity and diet-related chronic diseases. Therefore, this analysis uses a framework developed for evaluating the ethics of obesity-related public health programs. [25] This framework, by Ten Have and colleagues, [25] considers the impact of programs on: physical health and health behaviors, psychosocial well-being, equality, informed choice, liberty, social and cultural values, privacy, and responsibility. In addition to health and psychosocial consequences, this analysis considers economic consequences that can impact health and well-being. Because they are related concepts, informed choice and liberty will be discussed together, and privacy will not be examined due to lack of relevance.

### 2.1. Physical health and health behaviors

#### 2.1.1. SSBs taxation reduces consumption and purchasing of SSBs

A critical consideration for any public health intervention is whether it improves health or the health behaviors known to determine health outcomes. There is strong evidence that SSB taxation reduces purchasing and consumption of SSBs. For instance, in response to Mexico's 1-peso/liter SSB tax, purchase of SSBs dropped 10% by year two of the tax. [15] Likewise, within a year of Berkeley, CA implementing a 1-cent/oz SSB tax, supermarket sales of SSBs declined 10%, [12] and SSB consumption in low-income neighborhoods dropped 21%; [10] after 3 years, this decrease in consumption was 52%. [11] Within a year of the sweetened beverage tax in Philadelphia, PA (which also applies to artificially-sweetened beverages), net sales of taxed beverages decreased 38%, [13] adult soda consumption declined 31%, [26] and SSB consumption declined among adults overall [14] and children who were frequent SSB consumers. [26] Likewise, SSB taxes led to significant reductions in sales or consumption of taxed beverages in Seattle, WA [27]; Catalonia, Spain; [16] and Saudi Arabia (which has a carbonated beverage tax). [28] Teng et al. [17] conducted a meta-analysis of 17 studies of SSB taxes and found that these taxes, scaled to 10%, reduced SSB consumption/purchases by 10%. The authors conclude that SSB taxes “have been effective in reducing purchase and dietary intake” of SSBs. [17] Although it will be years before the health impacts of reduced SSB consumption manifest, modeling studies predict meaningful reductions in BMI, obesity, type 2 diabetes, and cardiovascular disease. [3,4] A nation-wide 1-cent/oz tax is predicted to avert 101,000 disability-adjusted life years and gain 871,000 quality-adjusted life years over a decade in the U.S. [3]

Most public-health SSB taxes have been excise taxes, which are levied on distributors or manufacturers. Excise taxes reduce SSB consumption through several possible mechanisms. The most well-studied mechanism is that excise taxes usually result in higher retail prices, [12,13,27,29–31] reducing demand for the taxed products. This happens because SSB distributors typically respond to taxation by raising prices to retailers, which then raise SSB prices for consumers. Relatively small excise taxes (e.g., 20%) can produce meaningful reductions in SSB consumption (e.g., –24%). [32] Second, during political campaigns

leading up to enactment of SSB taxes, pro-tax arguments have highlighted the health harms of SSBs. [33] Public exposure to this information could help consumers make informed choices to lower their SSB consumption. [34] Third, SSB tax revenues can be used to fund programs that further discourage SSB consumption. [21,35] Fourth, SSB taxes—particularly those that are tiered or levied based on sugar content—can reduce consumption of added sugar by incentivizing manufacturers to reformulate SSBs to contain less sugar [36–38] or to expand their portfolio of unsweetened beverages. In the UK, which has a tiered tax, sales of sugar from SSBs declined 30% over 4 years, attributed mostly to reformulation. [36] There is a dearth of research on the extent to which SSBs have been reformulated by simply removing sugars, versus replacing sugars with non-nutritive sweeteners (NNS). Both approaches should reduce obesity and risk for type 2 diabetes in adults, but uncertainties around long-term health consequences of NNS for children have prompted concerns about potential overuse of NNS in reformulation. [39] It should be noted though that neither SSBs nor beverages containing NNS are recommended for children. [40,41]

#### 2.1.2. SSB tax revenues fund public health and education

To date, SSB tax revenues in the U.S. have been largely dedicated to health equity programs; accessibility of drinking water, physical activity, and healthy food, especially for children and low-income populations; public parks and recreation; healthy beverage campaigns; dental services; the CDC's Diabetes Prevention Program; nutrition education in public schools; universal prekindergarten; and community college tuition. [18–21,35,42,43] These programs aim to directly improve health or to address the social determinants of health (e.g., education), particularly in communities most affected by SSB marketing, consumption, and diet-related disease.

### 2.2. Psychosocial health

Ten Have et al. [25] were chiefly concerned about the potential for an intervention to cause unwarranted fear and concern, stigmatization and blame of individuals who are overweight, and weight-based discrimination. SSB taxation is unlikely to contribute to any of these outcomes for the reasons below; however, these psychosocial measures have not been included in SSB tax evaluations.

First, data on SSB consumption and health knowledge suggest insufficient awareness and concern. There is strong evidence that SSBs cause weight gain and increase risk for type 2 diabetes, heart disease, and tooth decay. [44–46] Yet, over 60% of children and 50% adults in the U.S. consume SSBs daily, [47] often exceeding daily added sugar limits [48,49] from SSBs alone. Although this daily consumption could be a choice made with full awareness of health consequences, research suggests that it is not. Studies indicate misperceptions about the healthfulness of SSBs, particularly fruit-flavored drinks, sports drinks, sweetened water, and fruit-flavored soda. [50–52] Seeing a slightly higher shelf price at the point-of-selection is unlikely to result in unwarranted fear and concern. Instead, this higher price may act as a cue to more carefully consider one's beverage selection. This cue, together with exposure to pro-tax campaign messaging about health consequences of SSBs, may empower consumers to make healthier choices.

Second, it is unlikely for SSB excise taxes to stigmatize individuals based on weight or disease status. First SSBs are consumed broadly by individuals of all sizes. [53] Second, excise taxes target a product and its distributors, not individuals who are overweight. Although pro-tax campaigns have used obesity prevention as a rationale for taxation, they also emphasize other health outcomes (e.g., type 2 diabetes, heart disease), the high sugar content of SSBs, [33] and plans to use revenues to fund popular programs (e.g., universal Prekindergarten). [54] Instead of blaming individuals for SSB consumption, pro-tax messaging has focused on industry's responsibility (e.g., aggressive marketing tactics). [33,55]

Lastly, the programs funded by SSB tax revenues may have positive

psychosocial outcomes by expanding opportunities for health and education (e.g., nutrition education, universal prekindergarten, parks and recreation opportunities, water availability).

### 2.3. Economic consequences

Modeling studies predict that SSB taxation will result in sizeable health care cost savings [3,4] and increased productivity by reducing chronic disease. [56] However, public announcements from business owners and industry-sponsored reports have claimed negative economic impacts of the tax, particularly job loss. The peer-reviewed empirical research thus far does not support claims of job loss. Using data from the Pennsylvania Department of Labor, Lawman et al. [57] found no statistically significant change in unemployment claims in Philadelphia compared to neighboring counties for affected industries or across all industries in the 14 months following the tax. Likewise, Guerrero-Lopez et al. [58] found no significant declines in national employment in related industries associated with Mexico's SSB tax in the 3 years following implementation. A simulation study of SSB taxes in California and Illinois estimated a net gain in jobs from SSB excise taxes. This study predicted that any potential beverage sector job losses would be offset by new employment in other sectors. [59] According to the City of Philadelphia, their beverage tax funded 250 new jobs, mostly in education. [19] Although job loss claims about SSB taxation have not borne out in the empirical literature on SSB tax implementations, job losses in some sectors would not be ethically disqualifying. The extent and magnitude of harm resulting for job losses would need to be evaluated against benefits of job creation, healthcare cost savings, [3,4] increased productivity. [56]

Macroeconomic impacts of SSB taxes are expected to be positive for the reasons outlined above; however, economic impacts on individuals will vary by their response to the tax and whether they are reached by funded programs. Those who make no alterations in SSB purchasing and who are unaffected by tax-funded programs would likely experience a net increase in costs to sustain their SSB purchasing. This sets SSB taxation apart from other SSB policies, like warning labels [60]: If distributors raise SSB prices in response to a tax, this would impose economic consequences on individuals who continue to purchase SSBs. However, individuals who respond by meaningfully reducing SSB purchases would experience an increase in disposable income by spending less on SSBs and potentially out-of-pocket healthcare costs. Those who participate in programs funded by SSB taxes like free pre-kindergarten could also experience economic gains.

### 2.4. Equality

Both pro- and anti-tax arguments have focused on equality, particularly fair distribution. However, as Barnhill and King [24] note, there is disagreement “about what it is that must be fairly distributed.” Tax opponents have focused on distribution of money, arguing that SSB taxes are regressive (i.e., result in a higher cost burden for low-income than high-income individuals) and are therefore unfair. Whereas, tax proponents emphasize distribution of health and social benefits, arguing that SSB taxes are progressive (i.e., result in a greater distribution of good health, educational opportunities, and other benefits to low-income individuals) thereby promoting equality.

As is the case with any flat tax or fee, if an SSB excise tax raises retail prices, the tax would be regressive with respect to income: a low-income individual would spend a greater percent of their income on the added cost than would a high-income individual. However, flat taxes and fees are widespread (e.g., general sales taxes, tobacco tax, parking fees), and “the fact that a specific tax is regressive is not usually considered a decisive argument against it.” [24] This is particularly the case for taxes on items that are not necessities, like SSBs or tobacco. Furthermore, claims about the degree of regressivity of SSB taxes appear to have been exaggerated. A systematic review found only a small

difference in the impact of SSB taxes on spending between low- and high-income households (e.g., an additional 0.1–1.0% of annual household income for low-income vs. 0.03–0.6% for high-income households). [61] For instance, a study modeling a 20% SSB excise tax in Australia estimated that spending on SSBs would increase by only AU \$3.80 (0.3%) more per person per year in the lowest vs. highest SES groups. [62] Studies modeling effects of SSB taxes in the U.S. estimated they would result in less than a \$2 average difference in annual spending increases between high and low-income individuals. [61,63–65] Evidence from Mexico's SSB tax shows that low-income households reduced their purchasing of SSBs by 3 times as much as high-income households, lessening the tax burden on low-income households.

This greater reduction in SSB purchases among low-income households in Mexico provides direct evidence that SSB taxes have progressive impacts on health behaviors. [15] Compared to other groups, lower-income and racial/ethnic minority populations are exposed to more advertising for SSBs, [66–68] consume more SSBs, [44] and suffer disproportionately from diet-related chronic disease. [69,70] Thus, most modeling studies of SSB taxes in Western and Latin American countries predict that low-income and/or racial/ethnic minority households would experience the largest reduction in SSB consumption; largest gain in health- or disability-adjusted life year; and greatest reduction in obesity, chronic disease, and/or health care costs. [62,71–73] Additionally, in the U.S., SSB tax revenues have largely been spent on promoting health and social equity. [18,19,21,35,42,43] Thus, SSB taxes may have a net benefit for low-income households. [23]

### 2.5. Informed choice and liberty

Because they are interrelated, informed choice will be discussed alongside liberty. An informed (or autonomous) choice is one that is made (1) sufficiently free from external control—i.e., interference with liberty, (2) with an understanding of available options and their effects, and (3) with the psychological capacity to make choices that conforms with one's values and goals. [24]

Before probing these concepts, it is necessary to acknowledge that beverage choices (in absence of taxation) are not free of external control. Beverage choices are shaped by the availability of options, advertising, and other practices like subsidies, meal defaults, product placement, and preferential pricing. [74–76] Second, excise taxes are levied on the seller (i.e., SSB distributor) and not the buyer: “Sellers are free to assume the cost of the tax” [23] by not raising prices. However, because sellers do tend to raise prices, this paper considers how taxation impacts buyers' autonomous choice.

#### 2.5.1. Freedom from external control

Higher prices that result from SSB taxes restrict liberty in some ways, while expanding it in others. By raising retail prices, SSB excise taxes do not prohibit the purchase of SSBs, but as described by Véliz et al., [23] SSB taxes remove the option of paying a slightly lower price for SSBs (typically 10–20% lower). To put this price difference into context, from 1980 to 2011, the real price of carbonated drinks dropped by >30% in the U.S. [32] SSB taxes only partially reverse the historically low SSB prices in the U.S. For very low-income individuals, however, even a small price difference means not having the choice to consume as much SSBs as before, [23] or having to purchase a cheaper brand, or in bulk, to maintain the same consumption. Most beverage choices remain unchanged though.

SSB taxes also expand beverage options. SSB tax revenues have been used to increase access to free drinking water. [35] SSB taxes that are tiered or levied based on sugar content have prompted manufacturers to offer additional sizes of SSBs [77] and reformulate their products to contain less sugar. [37,78] Beyond beverage choices, the gains in health from lower SSB consumption would expand freedom to pursue life goals more broadly, further enhancing liberty. [23] Thus, while SSB taxation

may limit some beverage options, it expands other beverage options and life choices more broadly.

A final point regarding liberty is one of fairness over who—industry or government—may influence consumer choice, particularly when industry actions reflect a profit motive and government actions “reflect a concern for the well-being of its citizens.” [23] As Schwartz et al. [74] note, “...retailers and manufacturers are already influencing consumers in ways that are detrimental to their health, and if it is ethical to use strategies to sell more unhealthy products, it is certainly ethical to use alternative strategies to sell fewer.”

### 2.5.2. Understanding of choices and their outcomes

SSB taxation may improve understanding of beverage options and their effects. Evidence from national surveys suggests that there is a lack of sufficient understanding about the healthfulness of SSBs. In one survey, over half of parents perceived that a common sweetened water brand was healthy, [50] and in another survey, nearly half of youth believed that sports drinks were healthy. [52] Studies also indicate much higher health perceptions of fruit-flavored drinks than regular soda, despite similar sugar content. [50,51] A higher shelf price resulting from an SSB tax could fill this information gap by alerting the customer that a fruit-flavored SSB, for example, contains added sugar, despite looking like juice. Nutrition education [35] funded by tax revenues also serves to enhance understanding about the effects of different beverage options. However, there is a lack of empirical research on how SSB taxes affect SSB-related health knowledge.

### 2.5.3. Psychological capacity

As Barnhill and King [24] described, the “psychological capacity to control our eating...can be diminished by multiple factors:” food addiction, [79] social influences, environmental influences, lack of time and energy, and insufficient satiety cues from liquid calories. [80,81] For customers with adequate knowledge about the effects of SSBs but diminished psychological capacity, seeing a higher shelf price could activate their health knowledge at the point-of-selection. This could prompt the consumer “to consider more alternatives and to reflect on the value she derives from the beverage.” [23] However, research has not explored whether this contemplation occurs when consumers are faced with higher prices.

Through the three mechanisms described above, SSB taxes may enhance decision making that is consistent with one's goals—whether those goals are to improve health by drinking fewer SSBs, or to maintain current consumption, despite known health effects, because of pleasure or other value derived from SSB consumption.

### 2.5.4. Collective choice

SSB taxation is a direct consequence of voters' choice. In most U.S. cities with SSB excise taxes, individuals made the collective choice to enact SSB taxes by voting for them through direct democracy. Most of these taxes passed with wide margins of support (e.g., 74% in Berkeley, 62% in San Francisco, CA). This indicates that most individuals in these communities believed SSB taxation to be an acceptable policy. U.S. nationwide polling shows a similar pattern of majority support (57%) for SSB taxes that fund pre-school, children's health, and obesity prevention programs, [82] but there is variation in support by geography and political party. [82–84] Likewise, a meta-analysis of studies from around the world examining political and public acceptability of SSB taxes found 66% majority support for SSB taxes that fund health initiatives. [85]

### 2.6. Social and cultural values

Many foods and beverages have significant social, religious, ethnic, and cultural value. [86] For example, sticky rice cake (bánh chưng) on Vietnamese new year, turkey on Thanksgiving, cake on a birthday, or matzo ball soup for Passover. The pertinent questions here are: does an

SSB tax “hamper participation in social and cultural practices” such that it “diminishes positive feelings of community,” [25] and does it target only certain cultural groups? Because an SSB tax would not preclude the option of having SSBs on special occasions, it seems unlikely to diminish positive feelings of community. Even if SSBs are consumed less often, there are many substitutes (e.g., diet soda, sparkling water or juice, unsweetened tea) that are unlikely to diminish the overall value of an occasion. However, empirical research has not explored these issues, perhaps due to the perceived unlikelihood of harm to social and cultural values. Second, given that SSBs are not a staple food of any traditional diets, it appears unlikely that an SSB tax would unfairly target a specific culture or cuisine.

### 2.7. Responsibility

Policies and interventions convey information about whose responsibility it is to promote health. The causes of obesity are complex and have their roots in the environmental changes that occurred in the past several decades (e.g., changes in food marketing, availability, and affordability; access to spaces for physical activity; portion sizes). [87,88] Thus, it is ethically problematic when interventions put the onus entirely on the individual. To address diet-related disease, action will be required by individuals, families, institutions, government, and industry. [87] SSB excise taxes touch upon multiple levels of responsibility. First, individuals and their elected policymakers were responsible for enacting SSB taxes via direct democracy or by legislative action. Second, by incentivizing reformulation of products, SSB taxes place onus on the beverage industry to be part of the solution. It is also the responsibility of the SSB distributor, not the individual, to pay the excise tax; as one policy scientist said, “It's in keeping with the ‘polluter pays’ principle that the manufacturers (as opposed to the consumers) pay—especially if the revenue raised is invested on measures to improve health.” [89] SSBs generate negative externalities in the form of healthcare costs for the government and ultimately tax payers, and collecting the tax is a way of recouping costs. Although SSB distributors could assume the cost of the tax without raising prices, distributors typically do raise prices. The consumer is then responsible to act upon that price increase. The government is responsible for administering the tax and allocating its revenues. When institutions (e.g., school nutrition programs, community health organizations) are funded by tax revenues for health-related programs, they are responsible for health promotion as well. Thus, SSB excise taxes result in a fairer distribution of responsibility than programs targeting just one party.

## 3. Discussion

There are now 8 U.S. jurisdictions and over 40 countries that have implemented SSB taxes, with more likely to follow. [90] This paper considered the ethical implications of SSB taxation using a framework that ten Have and colleagues [25] designed for analyzing the ethics of obesity-related interventions. The analysis of available evidence suggests there is a strong ethical case for SSB excise taxes. These taxes are defensible across each relevant domain in ten Have's framework.

In summary, there is substantial evidence that SSB excise taxes reduce consumption and purchasing of SSBs, [10–17,27] a health behavior that contributes to weight gain and risk of cardiometabolic disease. Modeling studies predict population declines in obesity and diet-related disability and mortality from SSB taxation. [3,4] SSB tax revenues are funding evidence-based interventions (e.g., prekindergarten, Diabetes Prevention Program) for improving health and well-being. Because SSB taxes are specific to a product and its manufacturers, they are unlikely to adversely impact psychosocial health by stigmatizing people who are overweight. Evidence to date projects positive economic impacts from large reductions in health care costs, [3,4] and increased productivity. [56] The net impact of SSB excise taxes is likely to be greater equality because low-income individuals are expected to accrue the largest

health benefits from the tax. The tax appears to reduce SSB consumption in low-income households the most, [15] and to date, tax revenues have largely been spent on health and social equity in the US. Regarding liberty, SSB taxes do not eliminate the option of buying SSBs. If SSB distributors raise SSB retail prices in response to a tax, this eliminates the option for the consumer to buy the exact same brand and amount of SSBs at the same price—a narrow restriction on options. [23] Meanwhile, the tax can expand beverage options by funding drinking water availability and prompting industry reformulation, and expand overall freedom by averting poor health. Informed choice may be facilitated by seeing a higher SSB shelf price (indicating a drink contains added sugar) and by exposure to nutrition education funded with tax revenues. SSB taxation is unlikely to negatively interfere with social or cultural values: Taxation would not eliminate having SSBs for special occasions, SSBs are not a staple of traditional diets, and there are many potential SSB substitutes (e.g., sparkling water, unsweetened tea, diet soda) to serve or share during social occasions. Lastly, SSB taxation attributes responsibility for health to industry, government, institutions, and individuals. This spread of responsibility accurately reflects the complex causes of obesity and recommended solutions. [87]

This analysis identified some areas where more research could better elucidate ethical implications of SSB taxes. For instance, future SSB tax evaluations could include measures of consumer knowledge of the health consequences of SSBs, consumer empowerment, alignment of consumer's post-tax behaviors with their long-term goals, weight bias, social and cultural values around food, and perceived attribution of responsibility for obesity. There is also the need to continue to evaluate the long-term health and behavioral impacts of SSB taxes and the programs they fund. This includes continuing to build the evidence base on how SSB taxation impacts health and social equity.

A separate but related issue that requires ethical examination is the SSB industry's response to SSB taxation and public health nutrition policies. This response has included funding studies that cast doubt on the scientific evidence linking SSBs to health, funding non-profit organizations that divert the focus away from SSBs and toward physical inactivity, bringing legal challenges to SSB taxation [91] and spending over \$100 million since 2009 on anti-tax campaigns. In anti-tax ads, the SSB industry has used deceptive [21,92] messaging that equates an SSB tax to a grocery tax that raises the price of foods. Ads have featured images of produce and quotes from store owners, some who later said they were misled by the anti-tax campaign. One Oakland store owner featured in anti-tax ads later said, "They tried to use me, and use the business." [93] Another SSB industry response has been lobbying for state preemption of new local SSB taxes. State preemption, a strategy long used by tobacco and firearms industries, takes away voters' freedom of choice to decide for themselves if they want SSB taxation in their community. [94,95] These industry actions warrant scholarship into their ethical implications.

#### 4. Conclusions

The prevalence of diet-related diseases continues to rise in the U.S. and globally. By 2030, it is projected that half of all American adults will be classified as obese. [96] Multiple policies and multi-sector actions are needed to reverse the obesity epidemic and prevent diet-related diseases. This analysis finds that SSB excise taxes are one such policy that appears to be both effective and ethically defensible.

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