

# Is Sugar the new Tobacco? Insights from Laboratory Studies, Consumer Surveys and Public Health

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**Abstract** In the Americas, mean energy intake from added sugar exceeds recent World Health Organization recommendations for free sugars in the diet. As a leading contributor to this excess, sugar-sweetened beverage (SSB) overconsumption represents a risk for the population's health. This article provides an overview of clinical and epidemiological evidence, marketing practices, corporate influence and prevention strategies related to added sugar and SSB. For each aspect of this multidimensional profile, we briefly compare SSB to the case of tobacco pointing to similarities but also major differences. Tobacco control has demonstrated the effectiveness of long term multifaceted prevention strategies in multiple settings supported by strong public policies which may be applied to the consumption of SSB. However, translating these policies to the specific case of SSB is urgently needed, to inform preventive actions, decide which intervention mix will be used, and evaluate the process and impact of the chosen strategy.

**Keywords** Sugar · Sugar-sweetened beverages · Public health · Taxation · Tobacco · Marketing practices

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## Introduction

Refined sugar is an important contributor to energy intake in the diet of Americans. In the US, 13% of adult energy intake comes from added sugar while this proportion rises to 16% for youth [1, 2]. Excessive consumption of sugar has been associated with dental caries, metabolic syndrome, type 2 diabetes and, in some cases, with body weight gain: it is considered a major public health issue [3–6]. In 2014, the World Health Organization (WHO) published draft guidelines that recommend limiting the intake of free sugars (which include added sugar and naturally occurring sugar in honey, syrup and fruit juice) to less than 10% of daily energy intake. Furthermore, these guidelines suggest that fixing this upper limit at 5% could bring additional health benefits [7].

While various foods can contribute sugar to the diet, sugar-sweetened beverages (SSB), including regular soft drinks, remain the single most contributing source of added sugar in the US diet [1, 2, 8]. National surveys show that, in the US, 5% of daily energy intake comes from regular soft drinks [8]. In Mexico, SSB contribute to 12% of youth's daily energy

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intake, while this proportion is 13% in adults [9]. In Canada, 5% youth's daily energy intake comes from SSB, while this proportion is 3% in adults [10]. These numbers, which consider the energetic contribution of beverages only, demonstrate how reaching the recommended 10% maximum daily energy intake from free sugars will be challenging.

Moreover, these data only show part of the issue as they report the proportion of energy from mean consumption of the whole population rather than the intake of consumers only. For instance, while 50% of US population does not consume SSB, 25% consume up to 1.5 can (532 ml), and 5% consume more than four cans (1419 ml) of SSB a day [11]. In Mexican adults [9], the intake of regular soft drinks in the population is 201 ml/day, representing 4% of daily energy. When considering regular consumers only, the intake more than doubles (478 ml/d) and reaches 10% of daily energy [9].

The current levels of added sugar consumption seriously impact the health of the population as a whole and SSB consumption contributes to this situation. Consequently, the parallel between SSB and tobacco is frequently made in the media. Both products pose public health risks due to their large scale consumption or use, increase the burden of chronic diseases and ensuing health care costs, employ aggressive marketing strategies, rely on powerful lobbies, and present the consumption/use of their product as normal and alluring. As a result, lessons from tobacco control prevention strategies may be applied to the prevention of SSB overconsumption. This article provides an overview of clinical and epidemiological evidence, marketing practices, corporate influence and/or prevention strategies related to added sugar and SSB, and discusses how this multidimensional profile compares to the case of tobacco.

## Clinical Evidence

Carbohydrates are the main source of energy in our diet. There are different types of carbohydrates. Polysaccharides, such as fiber and starch, are complex carbohydrates whereas simple carbohydrates are monosaccharides (glucose, fructose and galactose) and disaccharides (sucrose, lactose and maltose). The sugar literature focuses on simple carbohydrates and especially the monosaccharides.

### Added Sugar and its Potential Hazards

While glucose is used by all body cells, fructose is mainly metabolized by the liver and the kidneys. The food industry has turned to fructose as a sweetener, as it comes from corn, which is grown in abundance and is inexpensive. For several decades, the increasing intake of processed food has greatly changed the nutritional profile of consumers and the quality of their diet. As excessive sugar intake has been associated with

various pathologies, a growing literature questions the toxicity of simple sugars, especially fructose [12, 13].

Beyond issues of sugar's toxicity, is there a sugar addiction? Research on the addictive potential of sugar in humans is recent. Few studies are available and most studies that establish a link between sugar and dependence use animal models [14]. A brain imaging study in humans by Tang et al. showed similarities in neural regions involved in the response to food and tobacco, especially the brain regions associated with reward system [15].

### Clinical Implications of Added Sugar Overconsumption

Different types of sugars do not necessarily have the same functions or effects on appetite regulation. First, dietary fibers provide a satiating effect due to their volume, without adding extra energy. Unlike fiber, simple sugars provide little satiating effect, which can foster excessive energy intake [16]. However, studies that have examined the differences between the regulatory mechanisms of satiety of various types of fructose-containing sugar such as sucrose, fructose and high fructose corn syrup (HFCS) did not come to conclusive results [17, 18]. Researchers assume that these rapidly absorbed carbohydrates may cause a higher glycemic load, which would be associated with greater insulin response and thus an increased risk of fat accumulation [19, 20]. Many studies support the idea that excessive sugar consumption affects health beyond the extra energy provided [13]. From a clinical standpoint, excessive consumption of sugar is undoubtedly involved in the development of chronic diseases such as obesity, type 2 diabetes, dyslipidemia and hepatic steatosis (non-alcoholic fatty liver) [21]. Links between sugar and certain forms of cancer have also been suggested [22].

In addition, several studies suggest that energy consumed in liquid form would lead to lower satiety levels than those taken as solids [16, 23, 24]. Several mechanisms are proposed to explain this phenomenon, including chewing, the rate of gastric emptying and its impact on hormones related to appetite (ghrelin and cholecystokinin) [23, 25]. There is less compensation for liquid energy consumed which is then additive to the energy from the solid food they accompany [25–27]. This could contribute to the current obesity epidemic and its comorbidities.

Since SSB represent a major source of sugar in the diet, we will focus on SSB in the following sections. Most health authorities (IOM, WHO, Yale Rudd Center, CDC, APHA) use a qualitative definition of SSB that include non-alcoholic, carbonated or non-carbonated beverages containing added sugar (in the form of glucose, sucrose, HFCS) or any other caloric sweetener. Specifically, SSB include regular soft drinks, sports drinks, energy drinks, fruit drinks (punches, cocktails or “-ades”), sweetened water and sweetened teas and coffees. While some instances include sweetened milk such as

chocolate milk, others do not (APHA) due to their high nutrient content compared to other SSB. Few definitions are based on a quantitative definition of sugar content per volume. These are currently used by some countries or states that have enforced a SSB tax.

#### Parallel with Tobacco

As for cigarettes, there are no data demonstrating any health benefit associated with the consumption of SSB. Conversely, from a clinical standpoint, chronic overconsumption of added sugar is associated with various pathologies.

However, to a certain extent, the human body needs sugar to function. Unlike tobacco, which is dangerous "from the first cigarette", it is commonly the "excessive" use of added sugars and particularly SSB which is questioned. Although not recommended because of their low nutritive value, SSB may be consumed sparingly and in limited portions without serious consequences [28].

### Epidemiological Perspective

#### SSB Consumption Trends

Data indicate that U.S. consumption of added sugars increased by 30% in adults and 20% in children over the last three decades. Despite recent declines, sugar intakes are still well above the recommended amounts [29]. SSB consumption is considered as an important contributor to total sugar intake.

While SSB industry volume sales have recently declined in North America as well as in Europe [30] over the last years, they still reach high levels, especially in the US. In Canada, SSB consumption increased from 55 to 117 litres/capita between 1972 and 1998, before declining to 85 litres/capita in 2009 [31].

In us consumer surveys, soda and soft drinks are the highest ranked food sources of carbohydrates in adults, adolescents and children, and a major contributor of energy in the diet [32]. Consumption levels are particularly striking in adolescents, representing on average up to 5%, 8% and 13% of their total energy intakes in Europe, Canada and the US, respectively (Table 1). A growing body of evidence also suggests that SSB consumption is associated with a less healthy dietary pattern (e.g. frequent fast food meals, lower intakes of fruit and vegetable and breakfast skipping) [32, 33].

#### SSB Overconsumption, Chronic Diseases and Obesity

In the scientific literature, several review articles and meta-analyses have examined the relationship between

consumption of sweetened beverages and weight gain. Some authors suggest an independent deleterious effect of the consumption of SSB on weight leading to an adequate standard of proof to discourage consumption [34, 35, 36]. In 2011, Mozaffarian et al. looked at the links between selected eating behaviors and weight gain over a 4-year period. They demonstrated that SSB consumption is a nutritional factor that is positively associated with weight gain [37].

Several meta-analyses and review articles have attempted to assess the associations between SSB consumption and energy intake, weight gain, adiposity and risk for overweight or obesity [38]. However, no intervention study has yielded solid scientific conclusions about the relationship between SSB and obesity risk beyond the energy overconsumption generated by these drinks [32]. Both the WHO consultation expert (2003) and the World Cancer Research Fund (2007) underlined that the excessive consumption of SSB could be a risk factor for weight gain. This hypothesis has progressed since 2007, with recent experimental data suggesting the existence of such a relationship. The magnitude of this relationship is modest and the long-term effect still uncertain [39–42].

However, there is a growing literature that associates SSB with several health problems [3]. Studies have shown that high consumption of SSB is linked not only to obesity [34, 42] but also to metabolic syndrome [43], type 2 diabetes [4], as well as cardiovascular diseases [5]. The consumption of 455 ml of SSB for 6 months was associated with lipid accumulation in the liver, muscle and visceral fat [44]. According to Yang et al., participants who consume 17 to 21% of their total

**Table 1** Estimation of SSB contribution to total energy intakes in US, Canadian and European adolescents in the early 2000s

	US	Canada	Europe
<b>Survey</b>	NHANES <sup>1</sup>	CCHS <sup>2</sup>	HELENA-CSS <sup>3</sup>
<b>Period</b>	1999-2004	2004	2006-2007
<b>Age group</b>	12-19 y	14-18 y	12.5–17.5 y
<b>% of total energy from SSB</b>	13 % <sup>4</sup>	8 % <sup>5</sup>	5 % <sup>6</sup>

<sup>1</sup> National Health and Nutrition Examination Survey. Average of 24-hour dietary recalls from the 2 cross-sectional surveys [104]

<sup>2</sup> Canadian Community Health Survey – Nutrition. 24-hour dietary recall [105]

<sup>3</sup> Healthy Lifestyle in Europe by Nutrition in Adolescence Cross-Sectional Study. Average data from beverage consumption patterns across 8 European countries (n=2741). Mean of two 24-h recalls [106]

<sup>4</sup> Including soda, sport drinks, fruit drinks and punches, low-calorie drinks, sweetened tea, and other sweetened beverages

<sup>5</sup> Including regular soft drinks and fruit drinks (average calculated from boys and girls percentages)

<sup>6</sup> Including calorically sweetened soda, fruit drinks and sports drinks

energy intake from added sugars are 38% at higher risk of cardiovascular diseases than those who consume 8% [45]. In addition, consumption of SSB during adolescence and increased intake of SSB between childhood and adolescence are both predictors of overweight in adulthood [19]. Moreover, WHO (2003) associates the quantity and frequency of added sugars consumption as the most important nutritional risk factor in the development of dental caries [46].

#### Parallel with Tobacco

Chronic consumption of SSB is particularly associated with a higher risk of certain chronic diseases at the population level and should, as such, be the subject of targeted prevention efforts. Current excessive consumption levels especially among young people also justify prevention efforts. Nevertheless, the comparison of epidemiological risks associated with the consumption of SSB and tobacco consumption must be tempered. Cigarette smoking is specifically associated with a very high risk of developing many degenerative diseases and cancers [47]. Given the multifactorial aetiology of diabetes, cardiovascular diseases and other diseases associated with poor diet, the specific effect of the excessive consumption of SSB is and will remain difficult to establish. Prevention efforts remain no less justified, but they must also address other risk factors (e.g. salt consumption, consumption of saturated fat, etc.).

#### Marketing Practices

While SSB consumption shows a levelling off in North America and Western Europe after decades of growth, it remains a leading market in those regions and a rapidly growing one in low- and middle-income countries such as in Brazil and China [48, 49]. In Canada, carbonated soft drinks represented the second highest non-alcoholic beverage volume market share, after coffee, and before tea, milk, bottled water and fruit drinks [50]. Aggressive marketing practices on product diversification, availability, price and promotion have been described as a contributor to SSB overconsumption.

#### SSB, an Attractive Choice

The market includes a multitude of brand and flavours of bottled water, juices, fruit flavoured beverages, dairy-based beverages, iced tea, vitamin waters, sports drinks and energy drinks. It is worth noting that the recent downward consumer demand driven by health concerns has encouraged manufacturers to reduce sugar content of their products and to develop natural alternatives to intense sweeteners [51]. Besides

product diversification, higher intakes have been prompted by steady increases in portion sizes. Between 1977 and 1996, US consumption surveys show that the average SSB portion size consumed by all age groups increased from 408 ml to 630 ml, whereas milk beverages' average portion size decreased from 351 ml to 321 ml [52].

#### SSB, an Affordable Choice

In high-income countries, an increasing affordability gap is generally observed between SSB and other foods (e.g. meat, fruit and vegetables, etc.). Overtime, advances in agriculture and food technologies as well as food policies have contributed to lower production costs of added sweeteners, making these ingredients a tasty, convenient and low-cost option for manufacturers [53]. As a consequence, SSB are generally considered to be very affordable products which may contribute to explaining higher intakes by low-income consumers [54, 55].

#### Strong SSB Promotion

In 2009 in the US, carbonated beverages companies' marketing expenditures targeting youth (mainly teens-directed) reached \$395 million (i.e. 22% of all food categories). Traditional techniques are complemented by sales promotion, movie cross-promotions, using celebrities, brand mascots or characters, web sites, packaging, point-of-purchase displays, sponsorship of sports events, etc. [56]. Evidence indicates that advertisements are usually appreciated by youth and have been shown to influence their diet-related behaviours [57]. The evidence is scarcer and mixed in adults [58].

While industries have made efforts over the years in reducing the outstanding SSB availability, marketing investments still make them very attractive, affordable, available and trendy options, especially for adolescents. Although the context, timing and products are different, these aggressive marketing practices echo the tactics used by the tobacco industry in the past.

#### Parallel with Tobacco

To maintain business development, counteract public health efforts and adjust to consumer demand, tobacco manufacturers have developed innovations in production capabilities, market expansion (including towards developing countries), product diversification (e.g. using flavors such as menthol), expended and targeted placement, successful promotional campaigns (including cartoonish characters, entertainment sponsorships and increasing web-based promotion targeted young adults), low prices and added convenience (again, especially towards youth to foster initiation and addiction). Parallels

between some tobacco and soft drinks marketing practices have generated calls to action, in order to prevent making soft drinks “the dietary version of the cigarette” [59].

### Corporate Influence

The existence of a “tobacco playbook” used by the industry to preserve its commercial interests despite severe health concerns tied to cigarette consumption has been widely denounced. Due to the implication of SSB in the development of overweight and type 2 diabetes, corporate strategies of soda and tobacco manufacturers have often been compared. While the two products and the two industries differ in many ways, the lessons learned for tobacco control can suggest how advocacy efforts may be useful to balance against such an influence [60–62].

#### Influence to Frame the Debate on the SSB Issue

The tobacco-SSB comparison is strong when considering that both manufacturers have tended to focus responsibility on consumers’ information and freedom of choice rather than on industry practices. Strategies have included political influence, media relations, social media techniques and public opinion campaigns. In similar ways, both have used corporate influence to boost companies’ popularity and brand preferences especially towards youth. Although controversial, SSB corporate social responsibility (CSR) efforts, e.g. via the sponsorship of physical activity and health promotion programs, are often presented by the industry as a way to be ‘part of the solution’. However, these practices are criticized as a way to improve public image and reduce the risk of regulation. SSB manufacturers are called on for greater transparency and significant changes in their core activities (e.g. product formulation, marketing to children). Conversely, public health advocates are encouraged to tightly monitor CSR efforts and to educate the public and policy makers about corporate influence [48, 59, 61, 63] as well as potential bias due to nutrition research funded by industry, which is also questioned [64, 65].

#### Influence on Public Health Interventions

Similar to the tobacco industry’s previous approaches, the SSB industry invests significantly in neutralizing some public health efforts [61]. For instance, in the US, the SSB industry played a major role in defeating numerous taxation bills. Massive investment in advertising and public relations campaigns also contributed to defeat the ban on selling sugary drinks larger than 455 ml at restaurants, street carts, stadiums and movie theaters approved by New York City in September

2012. Minority groups also opposed the measure highlighting the economic consequences for minority-owned small businesses [62, 66]. Although it remains uncertain whether industry funding may have influenced these positions, Shelley et al. [62] observe that initiatives of these groups are sponsored by the SSB industry, which gives the perception of a conflict of interest. Conversely, the recent adoption of a penny-per-ounce SSB taxation in Berkeley, California, is an example of successful public health advocacy efforts. Despite explicit opposition from the American Beverage Association and industry-funded advocacy groups denouncing a dubious way to meet budgetary needs, the proposal has been adopted and may pave the way for similar measures across the country [67].

#### Parallel with Tobacco

First, the lack of adequate information on the negative health consequences of tobacco has been widely denounced as well as the industry’s active role in funding scientific research instilling doubts regarding tobacco-related health concerns [60, 68]. Second, the strong relationship with minority groups developed by the industry thanks to targeted marketing strategies and philanthropic engagements have also been underlined [62]. Third, examples of efforts engaged by the industry and retailers’ association to defeat public health measures via media and public relations strategies have also been described [69]. Finally, the numerous corporate social responsibility activities run by tobacco industries such as philanthropic contributions (e.g. to causes such as homelessness), youth smoking prevention programs, efforts to prevent regulation and litigation contributed to exacerbate the negative views of tobacco-industry opponents [60, 61]. Conversely, examples of multifaceted evidence-based advocacy strategy supported by high level politicians, public health authorities and wide civil society coalitions have proven success in supporting restrictions on cigarettes sale and promotion [70].

### Prevention Strategies

Considering SSB clinical and epidemiological evidence, nutritional value and consumption trends in youth, the reduction of SSB overconsumption and the promotion of healthier alternatives becomes a public health priority. Lessons from tobacco control strategies can be valuable.

#### Industry Voluntary Commitments

Over the last years, major food and beverage companies have incorporated nutrition concerns into their business model but much progress is still to be made in areas such as product formulation, accessibility and marketing [63]. Voluntary

industry commitments have recently been achieved to reduce SSB availability in schools [71, 72]. For example, according to the Canadian Beverage Association manufacturers have voluntarily removed soft drinks in elementary and middle schools and commitments also include regular soft drinks removal from secondary schools, capped energy content and non-availability of energy drinks [73]. SSB industry's voluntary commitments to limit marketing to children are frequently questioned. Such commitments are frequently made via industry "pledges" aimed to limit food and beverage advertising to children through television and other media [74]. However, inconsistencies have been observed in these pledges (e.g. age definition, nutrition criteria, media considered, etc.) as well as lapses in adherence to the commitments [75, 76]. The WHO has made concrete recommendations to urge member states to regulate marketing of non-alcoholic beverages and foods high in saturated fats, trans-fatty acids, free sugars, or salt to children and to better monitor industry efforts [77].

### SSB Taxation

When comparing SSB overconsumption prevention to tobacco control efforts, the effectiveness of sequential tobacco taxes is particularly highlighted since these measures are considered to be largely responsible for the drastic reduction of smoking rates over the past decades [78, 79]. As a result, SSB taxes are frequently discussed as an option to contribute to the prevention of obesity and chronic disease [80–82]. Simulation studies generally present food taxes as a particularly cost-effective option in obesity prevention, due to its low implementation cost, large population outreach and revenues generated, but their effectiveness in changing consumers' behaviours is controversial [83, 84]. Encouraging data from several countries show that SSB consumer demand is responsive to price change and that a 10% increase in soft drink prices may reduce consumption by 8 to 13% [85–87]. Based on such assumptions, modelling studies usually predict positive impacts of a 15 to 20% taxation on SSB consumption and health [88]. However, contrary to tobacco, which does not offer many alternative products, risks of SSB substitution by other high energy density foods and beverages exempted from a tax remain uncertain [89–91]. Moreover, youth who are overweight or from low-income families may be more responsive to SSB taxation but further studies are required on that matter [92]. Until now, few large-scale SSB taxation policies have been implemented and research tends to indicate that taxes have been too small to significantly influence dietary and health outcomes [93]. Well-designed impact evaluations of recently adopted SSB taxes such as in France [94], Mexico [95] and California [67] will be critical [96]. In any case, these knowledge gaps should not divert attention from the need for

comprehensive strategies combining interventions in a diversity of settings [97].

### Educational and Environmental Strategies

The literature comparing tobacco and SSB prevention strategies clearly suggests that a combination of incremental interventions and policies affecting sales and behaviours over time are crucial to success. A diversity of educational and environmental strategies shows promising results on SSB consumption. Whereas important knowledge gaps remain to be explored, evidence-based recommendations include: (1) to ensure access to free, safe drinking water in public places, worksites, recreation areas; (2) to develop school-based education programmes focussing on beverage choices; (3) to restrict SSB sales on and near school grounds; (4) to promote production and consumption of healthier alternatives to SSB; (5) to limit SSB marketing, especially towards children; (6) to restrict SSB service in kids meals and childcare and afterschool programs (7) to use pricing strategies combined with educational campaigns making healthful beverages an easier choice; (8) to make counselling about SSB consumption part of routine medical care; (9) to support education efforts about SSB overconsumption by community groups and coalitions; (10) to develop social marketing and public awareness campaigns aimed at preventing SSB overconsumption; (11) to limit SSB portion sizes [32, 78, 88, 98, 99, 100].

### Parallel with Tobacco

Significant increases in tobacco excise taxes have been recognized as an effective strategy to encourage cessation among tobacco users, to prevent tobacco initiation in potential smokers and to reduce cigarettes intakes in continuing consumers. Tobacco taxation also provides revenues that may be dedicated to health promotion efforts including tobacco control activities, but few governments do so, despite evidence showing that this type of earmarking increases political and civil society acceptability of tobacco taxes [101]. In any case, evidence clearly indicates that tobacco taxation gains in being combined with other measures for greater effectiveness. The WHO's Framework Convention on Tobacco Control (FCTC) has been frequently presented as a best practice that may inspire global healthy eating and physical activity promotion efforts, including those aimed at decreasing SSB overconsumption [102].

### Conclusions

Many parallels can be established between SSB and tobacco. Table 2 summarizes the main similarities and differences between these two public health issues as discussed in this paper.

**Table 2** Main similarities and differences in the battle against SSB and tobacco

<b>Main similarities</b>	<b>Perspective</b>	<b>Main differences</b>
<ul style="list-style-type: none"> <li>• No health added-value of consumption in both products</li> <li>• Tobacco consumption and added sugars chronic overconsumption both involved in the development of various pathologies</li> </ul>	<b><i>Clinical evidence</i></b>	<ul style="list-style-type: none"> <li>• Toxicity and addictiveness strongly documented in the case of tobacco; evidence still scarce for added sugars</li> <li>• Tobacco's harmfulness shown to be cumulative from the first cigarette; SSB's harmfulness tied to chronic consumption only.</li> </ul>
<ul style="list-style-type: none"> <li>• In the last decades, dramatic increases in consumption of both products, specifically in youth, thus justifying youth-targeted prevention efforts</li> <li>• Increased intakes of both products associated with higher risks of chronic diseases</li> </ul>	<b><i>Epidemiological evidence</i></b>	<ul style="list-style-type: none"> <li>• Magnitude of association between intakes and chronic diseases much stronger for cigarettes than for SSB</li> <li>• Efforts to prevent nutrition-related chronic diseases must address many other risk factors beyond added sugars and SSB</li> </ul>
<ul style="list-style-type: none"> <li>• Massive and aggressive marketing strategies make SSB and tobacco attractive, available and affordable</li> <li>• Strong regulations aimed at limiting marketing (especially towards youth) recommended in both cases</li> </ul>	<b><i>Marketing practices</i></b>	<ul style="list-style-type: none"> <li>• Tobacco sale prohibited under a legal age</li> <li>• Tobacco marketing practices have been subjected to coercive regulations; for SSB, policy response is still dominated by industry self-regulation</li> </ul>
<ul style="list-style-type: none"> <li>• Both industries have used similar techniques to frame the debate on individual responsibility</li> <li>• Successful public health counter-advocacy efforts in both cases to oppose corporate influence</li> </ul>	<b><i>Corporate influence</i></b>	<ul style="list-style-type: none"> <li>• Documented existence and denunciation of a "tobacco playbook" used by the industry to preserve its commercial interests despite alarming health concerns tied to cigarette consumption</li> </ul>
<ul style="list-style-type: none"> <li>• Success in tobacco control strategies rely on combinations of incremental interventions and policies</li> <li>• Similar approaches, combining individual and environmental strategies, recommended to prevent SSB overconsumption</li> </ul>	<b><i>Prevention strategies</i></b>	<ul style="list-style-type: none"> <li>• Consumer demand responsive to price increases in both cases</li> <li>• However, huge benefits of tobacco taxes unlikely to be equivalent in the case of SSB taxation because of greater substitution risks, i.e. compensatory higher intakes in tax-exempted calorie dense food and beverages</li> </ul>

While the evidence linking SSB consumption with health is not as abundant as for tobacco, public health action is warranted on the grounds of intake prevalence, excessive consumption levels (especially in youth) and aggressive marketing practices and corporate influence used by industry.

Prevention strategies for tobacco are geared towards eliminating its use. Alternatively, since SSB bring no added nutritional value to the diet, the goal could be for SSB to be consumed at occasional occurrences instead of making it a leading source of energy in our diets or making it a way to quench thirst.

Reducing SSB consumption will be complex. The parallel with tobacco control clearly calls for multifaceted prevention strategies on the long term, combining public awareness campaigns, educational programs, increased access to and promotion of healthy alternatives to SSB in multiples settings and policy efforts, e.g. to regulate SSB price, availability and marketing to youth. Public health initiatives need to be creative to address the SSB issue and push the public policy envelope, as is already being proposed by some [103]. To make a difference, further knowledge development specific to SSB is urgently needed, to inform preventive actions, decide which intervention mix will be used and evaluate the process and impact of the chosen strategy.

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#### Compliance with Ethics Guidelines

**Conflict of Interest** Yann Le Bodo, Marie-Claude Paquette, Maggie Vallières and Natalie Alméras declare that they have no conflict of interest.

**Human and Animal Rights and Informed Consent** This article does not contain any studies with human or animal subjects performed by any of the authors.

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