Q&A on Nutrition-Related Excise Taxes[1]

This Q&A was designed to provide detailed responses to commonly asked questions about what and how to tax when it comes to nutrition- related targets of excise taxes, including sugar-sweetened beverages, ultra-processed foods, and implications for taxing inputs such as raw sugar or salt. It is a companion to the Knowledge Note on Sugar-Sweetened Beverage Taxation.

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GLOSSARY

Ad valorem tax: an excise tax that is applied to the value of the product.

Codex Alimentarius Commission: an international food standards body established jointly by the Food and Agriculture Organization and World Health Organization in 1963. The Codex Alimentarius, or "Food Code", is a collection of international standards, guidelines and codes of practice to protect the health of consumers and ensure fair practices in the food trade.

Excise taxes: indirect taxes levied on the consumption of a specific set of goods that generate negative externalities and internalities.

Free sugars: sugar present in foods, other than sugars naturally occurring in intact fruit, vegetables and milk. More specifically, free sugars include monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates.

Interpretive nutrition labeling: provides simplified nutrient-specific text and/or symbols on the front of pre-packaged foods, to encourage and enable consumers to make healthier choices.

Non-alcoholic beverages: beverages that do not include alcohol; this includes sugar-sweetened beverages, beverages containing non-sugar sweeteners, dairy beverages, and plain water.

Non-sugar sweeteners: all synthetic and naturally occurring or modified non-nutritive sweeteners that are not classified as sugars. Common non-sugar sweeteners include acesulfame K, aspartame, advantame, cyclamates, neotame, saccharin, sucralose, stevia and stevia derivatives.

Nutrient composition: is the quantitative nutritional content of food, including all compounds relevant to health and nutrition. This includes fat, carbohydrate, protein, salt and micronutrients such as minerals and vitamins.

Nutrient profile model: a tool for evaluating the healthfulness of foods, which uses criteria regarding nutrient composition to assess and categorize foods.

Specific tax: an excise tax that is applied to a specific weight, volume or other measurement of product, in the case of SSBs, to the volume or the beverage or the volume of sugar.

Sugar: a sweet crystalline substance obtained from various plants, especially sugar cane and sugar beet, consisting essentially of sucrose, and used as a sweetener in food and drink.

Sugar-sweetened beverages: non-alcoholic beverages sweetened with added free sugars (for example, including fructose, glucose, high-fructose corn syrup, honey and/or sucrose).

Tariffs: indirect consumption taxes levied on imported goods, but not similarly domestically produced goods.

Tax structure: the type, base, and other attributes of taxes including thresholds and tiers. The type of tax refers to whether the tax is specific or ad valorem, while the base of the tax depends on the type of tax. For specific taxes, the tax base refers to whether the tax is applied to the volume of the beverage or sugar content, and for ad valorem taxes, where in the supply chain the tax is applied.

Ultra-processed foods: are food and drink products that have undergone specified types of food processing, and have been made using manufactured ingredients (as distinct from 'processed foods' that are made by combining foods, only).

Value Added Tax (VAT) or *Goods and Services Tax (GST):)* indirect consumption taxes applied to most goods and services

CONSIDERING NUTRITION-RELATED TAXATION

1. *What is the rationale for using taxes to improve diets and health?*

Unhealthy diets – in particular, diets high in salt, sugar and trans-fatty acids, and low in whole grains, fruits and vegetables – are associated with an increased risk of non-communicable diseases (NCDs), including diabetes, cardiovascular disease, obesity and some cancers [1-3].

The use of taxation has been recommended by the World Health Organization (WHO) as part of a broader package of policy measures to prevent obesity and diet-related NCDs [4, 5]. Taxes can play an important role by raising prices of unhealthy commodities and thereby reducing their consumption [6]. Taxes also increase market prices in order to account for the negative externalities and internalities that the consumption of unhealthy goods generates.

Negative externalities are the costs that accrue to society at large, including non-users of unhealthy commodities [7]. In the case of SSBs, externality costs arise from the impact of health care costs on societies, particularly in situations where there is public or private health insurance, and productivity losses resulting from NCDs [8, 9]. Negative internalities are the uninternalized costs borne by the user resulting from time-inconsistent preferences due to imperfect information, present-bias, and/or addiction [7]. Taxes on unhealthy commodities can be justified by considering the internalities. For example, they discourage people from initiating consumption of SSBs, particularly at young ages, and they increase prices to account for the underestimation of harm and difficulty of quitting in later life. The negative internalities resulting from unhealthy diets are due to the fact that consumers of unhealthy diets do not always correctly internalise the associated harms [8, 9]. A growing literature supports the taxation of SSBs by showing the significant negative internalities generated by SSB consumption [8-10].

2. *How do countries decide what is the best type of tax is best suited for nutrition-related taxes?*

SSB taxes and other nutrition-related taxes are almost always ***excise taxes***, which are indirect taxes levied on the consumption of a specific set of goods that generate negative externalities and internalities. Other approaches to taxation have included import tariffs and differentiated Value Added Taxes (VAT). Excise taxes can be levied as a specific tax (based on the volume of the beverage or sugar) or ad valorem tax (based on the value of the product). Generally, specific taxes are preferred to ad valorem taxes because they are more effective at targeting the specific components of food that are associated with the negative externalities and internalities; for example, sugar or trans fats. Conceptually, this is easy to understand: a cheaper SSB is not less harmful than a more expensive one, but rather the harm is closely correlated with the volume of beverage consumed. For many consumer products, larger volumes also become cheaper per unit, which means that volumetric taxes also use a more consistent basis for taxation. However, despite the advantages of specific excise taxes, ad valorem taxes have been implemented in many countries, often because of their administrative simplicity.

Tariffs are a consumption tax on imported goods. They raise the prices of imported goods relative to locally-produced goods. They are not generally considered a health tax since they do not affect the prices of locally-produced goods and thus more likely to affect where goods are produced rather than where they are consumed. Tariffs have been historically used for unhealthy food and beverage taxes in countries with very little formal domestic food processing, and where there is low domestic tax administrative capacity. For example, higher tariffs on unhealthy foods adopted in Tonga were effective in shifting consumption away from high-fat meats, ice-cream and SSBs [11].

Value-added taxes (VAT, or Goods and Services Taxes (GST)) are consumption taxes applied to most goods and services. It is most often applied as a uniform rate to as broad a range of goods and services as possible. This, along with the input tax credit, limits the distortionary effects, increasing its revenue-generating efficiency. VAT is often applied to food, but the preference for uniform VAT rates limits the ability to differentiate between healthier and unhealthier foods. Some countries exempt or zero rate some foods, but this is most often done due to equity considerations with no explicit health objectives. Some countries apply differential VAT rates on foods, where there are pre-existing differential levels, as is the case, for

example, in India[2]. However, the administrative cost and loss of efficiency of using a broad-based tax as a health tax may outweigh the benefits. In particular, VAT is limited in terms of tax structure and rate, and distinctions on the VAT base are associated with market distortions and litigation [12].

3. *What are the equity-related considerations for nutrition-related taxation?*

Equity considerations relevant to unhealthy food and beverage taxation are important for both tax policy and public health policy. Although there is variation between countries and products, there are several consistent features related to the distributional impact of a nutrition-related tax. First, expenditure on soft drinks and snacks tends to increase with household income, perhaps particularly in low- and middle-income countries [13], so price policies affect a larger number of high-income than low-income households. However, food expenditure comprises a higher proportion of overall expenditure for lower-income households, meaning that if they cannot change their consumption to avoid the tax, they may be affected to a greater extent. In addition, lower-income households are likely to be more price-sensitive, meaning that they may be more responsive to tax-induced price changes.

Equity impacts will thus depend on the extent to which the consumers can and do reduce consumption of the taxed foods (including substitution to untaxed foods). A well-designed tax that supports behavior change could effectively be progressive at the margin, due to the higher price sensitivity of lower-income consumers [9, 14]. In addition, there is evidence from SSB taxation that lower-income consumers may benefit disproportionally from medical savings and economic productivity gains [15].

Overall, expenditure on food is relatively inelastic, meaning that it can be hard for consumers to shift consumption to minimize their tax burden; however, many nutrition-related taxes only apply to very specific foods and beverages which are more elastic due to the potential for substitution. As a result, equity concerns are most salient for taxes with a broad base. Broad-based food taxes, such as those based on nutrient content, may be particularly regressive due to a more limited scope for substitution to untaxed products, particularly where they apply to core food groups. For example, single nutrient taxes targeting fat, salt and sugar tend to apply to foods across multiple food sub-sectors, and may also apply to foods recommended in dietary guidelines, such as meat and dairy products. Taxes that apply to very few products, such as SSBs or a small range of foods, are likely to be less regressive due to higher price elasticity of demand among lower-income households. For example, the sales of taxed energy-dense foods in Mexico declined more for households with low socioeconomic status [16].

Growing concerns regarding food affordability globally over the past few years will have increased the attention to the equity implications of food taxation. Globally, higher food prices were estimated by the International Monetary Fund to have added 6 percentage points to consumer food inflation in 2022 [17]. However, targeted unhealthy food and beverage taxes with a clear link to the health objective of the tax are likely to have limited impacts on household food budgets [9], and from an equity perspective can be complemented with well-targeted social assistance programs [18].

4. *What is the interface between nutrition-related taxation and other existing pricing and fiscal measures?*

The potential benefits of taxes on unhealthy beverages and foods need to be considered in light of existing price-related policies applied to food. A range of policies that directly impact food prices are applied throughout food supply chains, which can create price incentives for consumers that have (unintended) health consequences. These include production incentives such as agricultural subsidies or other price supports for crops such as sugar or corn. For example, price supports for corn production in the US have contributed to the production of high fructose corn syrup, used widely in processed foods and a subject of health concerns [19]. They also include food security and consumer protection measures, particularly in low- and

[2] India: https://cbic-gst.gov.in/gst-goods-services-rates.html

middle-income countries. For example, price control measures or consumer-oriented subsidies that focus on 'basic foods', which in some cases apply to foods associated with chronic disease risks such as sugar or animal fats (for example, lard). Policies that decrease food prices, including decreases in tariff rates and subsidies, are associated with higher overweight and obesity rates [20]. For example, consumer food subsidies for bread, addressing food insecurity were associated with the over-consumption of energy-dense foods in Egypt [21].

Where subsidies and other pricing mechanisms such as price controls exist, the amendment or removal of measures applying to unhealthy foods – such as sugar or sources of saturated fats – may be a complementary policy approach for aligning pricing incentives with health objectives. For example, the removal of subsidies on sugar in Malaysia in 2013 was associated with price increases, although there has not been a formal evaluation. In addition, where consumer subsidies exist, such as targeted discounting at the point of purchase for those on low incomes, incentives for healthier food consumption could also be integrated.

QUESTIONS ON SUGAR AND SSB TAXES AND THEIR DESIGN

5. What evidence is there linking the impact of sugar consumption on health?

Many of the diet-related taxes adopted to date have focussed on sugar. Increased consumption of sugar and refined carbohydrates was strongly associated with the development of NCDs [22]. In particular, excess consumption of sugar is associated with an increased risk of dental caries, increased body weight, low dietary quality, cardio-metabolic conditions (namely cardiovascular disease and diabetes), stroke and some cancers (mainly colorectal and breast) [23-26].

Many of these sugar-related health conditions contribute substantially to the global burden of disease. High body weight caused nearly 5 million deaths globally in 2017 and was responsible for the loss of 148 million disability-adjusted life years. From 1990 to 2017, the global deaths and life years lost that were attributable to high BMI have more than doubled. Obesity is a major risk factor for diabetes, with 52% of the global burden of type 2 diabetes attributable to high BMI [27]. In 2019, diabetes was the eighth leading cause of death and disability combined in the world [28]. In 2021, 6·1% of people globally were living with diabetes, equivalent to 529 million people. The cost of direct health expenditure due to diabetes was estimated at USD 760 billion in 2019 and is projected to grow to USD 845 billion by 2045 [29].

In addition to obesity and related NCDs, oral health conditions associated with sugar consumption also represent a major health burden. The global burden of oral health conditions, of which dental caries is a major component, increased in all regions of the world between 1990 and 2015; the disability-adjusted life years due to oral conditions increased by 64% during this period. The number of people with untreated oral conditions rose from 2.5 billion in 1990 to 3.5 billion in 2015 [30]. Dental caries are associated with pain and reduced cost of living, as well as substantial social and economic costs [31].

6. How much sugar is bad for health?

The evidence-based Guideline on sugar intake for adults and children published by the WHO in 2015 strongly recommended that intakes of free sugars should be limited, to improve health. The WHO Guideline on sugar intake for adults and children made a strong recommendation that free sugars should not provide more than 10 % of dietary energy intake in a healthy diet, and a conditional recommendation that free sugar consumption should be reduced further to not more than 5% of dietary energy intake [32].

Figure 1 // ***Typical sugar content of SSBs***

Source: WHO (2016) Be smart, Drink water: a guide for school principals in restricting the sale and marketing of sugary drinks in and around schools. WHO Regional Office for the Western Pacific Region.

Table 1 // ***Sugar intakes as a percent of energy intake, in selected countries***

Country	Percent of total energy intake by added and/or free sugars *or* total sugars		Overall intakes
	Added sugars	**Total sugars**	
Argentina[34]	15.9% (15-65 years)		
Australia[35]			More than half the study population exceeded WHO recommendations; this was especially true for children and adolescents.
Barbados[36]			24% consumed less than the recommended <10% of energy from added sugars
Belgium[37]		20% (>18 years) 25% (<18 years)	
Denmark[37]	8% (>18 years) 11% (<18 years)		
France[37]	8.0% (>18 years) 13% (<18 years)	15% (>18 years) 21% (<18 years)	
Hungary[37]	8% (>18 years) 12% (<18 years)		
Indonesia[38]		Approx. 7%	11.5% population consumed >50g sugar per day
Ireland[37]		17% (>18 years) 20% (<18 years)	
Italy[37]		15% (>18 years) 16% (<18 years)	
Mexico[39]	13%		
Netherlands[37]	11% (>18 years) 17% (<18 years)	21% (>18 years) 26% (<18 years)	
Norway[37]	7% (>18 years)		
Portugal[40]	7% 8% (free sugars)	19%	24% exceeded the WHO's free sugar recommendation; lowest adherence was children and adolescents.
Spain[37]		17% (>18 years) 18% (<18 years)	
Thailand[41]			Studies inconsistent: 2 to 20g/day (adult males) 2 to 16g/day (adult females); 25 to 50 g/day (children); Thai recommendation: 40 to 55g/day.
United Kingdom[37, 42]	7% 13% (free sugars)	20% (>18 years) 23% (<18 years)	
United States[43]	14% (2 to 8 years) 16% (9 to 18 years) 13% (>19 years)		Across all age and decile groups in this study, added sugar intakes exceed WHO's recommendations

Note: The estimates provided from the different studies in this table have been derived from varying methodologies. Between study comparison and interpretation should be done with caution.

In practice, for an 'average' person with an energy intake of 2000 calories per day, this guideline of 10% equates to 200 calories, which is approximately 50 grams or 12 teaspoons (tsp) of sugar per day – and a further reduction to 5% would be approximately 6 tsp of sugar. As a reference point, a small can of Coca-Cola (330ml) contains 8.5 tsp; a 44g bar of milk chocolate typically contains around 5.5 tsp of sugar. Even foods that are not always obviously sugary, such as breakfast cereal or tomato soup, can contain around 3 tsp of sugar in a single serve.[3]

The majority of people have intakes higher than those recommended; globally, around 13-24% of dietary energy intake comes from sugars [33]. Table 1 provides an overview of consumption in selected countries with relevant data. In all of these countries, average sugar consumption was in excess of the recommended 5% of intake, and in at least one population group in all countries, consumption was in excess of the maximum recommendation of 10% of energy intake. These estimates might also be considered to be conservative since most studies measure added sugars rather than free sugars, thus excluding many products (e.g., juice). With such a clear public health need for reduction in sugar intakes specifically, taxation has been a relatively common part of the policy package adopted to achieve this goal.

7. What are the main sources of sugar in peoples' diets? What does this mean for taxation?

Free sugars are consumed in multiple forms within diets [44]. The majority of sugar is consumed in 'hidden' forms – added to processed foods and beverages to increase palatability and other functions, without consumers necessarily being aware of its presence. Sugar is also added to foods and beverages during cooking and directly prior to consumption ('at the table'). Foods and beverages that contain sugar are nutritionally very diverse, and some also provide other important nutrients to the diet. This can range from vegetable-based main dishes which contain added sugar to develop flavor in addition to fiber and micronutrients, to sweetened dairy products that are an important source of calcium, and to sweetened breakfast cereals that provide iron and other micro-nutrients. For example, children in France obtained 16% of their dietary fiber from sweet snacks, and 11% of their calcium intake from fresh dairy (which also provided 8% of added sugar intake) [37].

However, the main sources of (free) sugars contribute little nutritional value to the diet (Table 2). Across 17 countries for which relevant data are available (although noting different methodologies used), major sources include SSBs, cereal products, table sugar, dairy products, sweet snacks, and bakery products. Notably, SSBs are one of the top few sources of free sugar consumed, particularly for children and adolescents [37-39, 42, 43, 45-49].

This means that taxes that target SSBs – or sub-categories of confectionary or baked goods that are high in sugar – will apply to major sources of sugar in the diet while also not applying to 'core' foods that contribute to a healthy diet.

8. How is sugar defined for the purposes of excise tax?

The terms 'sugar taxation' and 'SSB taxation' are often used interchangeably, and clarifying these definitions can support improved tax objectives and tax design. From a nutritional perspective, the 'sugar' that is associated with health risk is what the WHO terms 'free sugars'. The definition of free sugars includes sugar extracted from beet and cane (often referred to as 'table sugar'), sugars and syrups produced from other products, such as corn syrup or rice syrup, and the sugar in fruit juice. These sugars can be added at the point of consumption (such as table sugar added to hot beverages or cereals) or incorporated into prepared or processed foods and beverages (for example, baked goods, confectionary or SSBs).

The definition of free sugars is based on the evidence of health risks associated with their consumption [24] (see #5). This evidence-based definition is important because it helps to explain why sugar contained in 100% juice, for example, is a health concern, but why naturally occurring sugars in plain milk are not.

[3] Conversion to teaspoons informed by: https://www.dentalhealth.org/blog/how-much-sugar-is-in-your-foods-and-drinks.

In terms of the definition of sugar for taxation, the more closely a tax can target free sugars associated with health risk, the more a tax will 1) address the specific internalities and externalities associated with sugar consumption, and 2) create incentives for consumers to shift to healthier products.

Table 2 // ***Contribution of different food categories to sugar intakes in selected countries***

Country	Contribution to the intake of total sugars among children (5 to 18 years)	Contribution to the intake of total sugars among adults (>18 years)
Argentina[34]	Main sources of added sugars, contribution to total sugars intake: soft drinks 27% ; drink infusions 24%; baked goods (bread, cookies, cakes etc) 15% ; fruit juices 12%.	
Australia[35]	Percentage contribution to total added sugars: SSBs 36-58%; sweet baked goods 29%; sugar and sweet spreads 29-40%; confectionery/chocolate 28-32%; sweetened dairy products 26%; breads and cereals 9%; ice cream/confections 21-26%.	Percentage contribution to total added sugars: SSBs 42-54%; sweet baked goods 25-28%; sugar and sweet spreads 21-41%; confectionery/chocolate 24-28%; sweetened dairy products 27-35%; breads and cereals 10%; ice cream/confections 5-10%.
Barbados[36]		Sugar-sweetened beverages provide 43% (42.2%, 44.4%) of total sugar intake
Belgium[37]	Sweet cakes, spreads, confectionery, chocolate, ice cream – 27%; Soft drinks and fruit/vegetable juice – 25%	
France[37]	Sweet foods (cakes, spreads, confectionery, chocolate, ice cream) 32%; Soft drinks 18%	Sweet foods (cakes, spreads, confectionery, chocolate, ice cream) 32%; Soft drinks 12%
Indonesia[38]	In order of consumption: Cane and brown sugar, steamed cake, sweet canned milk, sugar and confectionery, ice cream, biscuits/cookies	
Italy[37]	Sweet foods (cakes, spreads, confectionery, chocolate, ice cream) 37%; Soft drinks 16%	Sweet foods (cakes, spreads, confectionery, chocolate, ice cream) 37%; Soft drinks 7%
Mexico[39]	Contribution to total added sugar: SSBs 53-66%. High sugar foods (e.g., cakes, cookies, confectionery, ready-to-eat cereals, sugar) 30-38%.	Contribution to total added sugar: SSBs 74%; High sugar foods (e.g., cakes, cookies, confectionery, ready-to-eat cereals, sugar) 20%.
Netherlands[37]	Sweet foods (cakes, spreads, confectionery, chocolate, ice cream) 34%; Soft drinks 32%	Sweet foods (cakes, spreads, confectionery, chocolate, ice cream) 32%; Soft drinks 20%
Portugal[40]	Contribution to daily added sugars intake Table sugar (23%), confectionery/candy/chocolate (16%, soft drinks (12%), cakes (11%), yoghurts (11%), cookies (9%), breakfast cereals 6%). Contribution to daily total sugars: fresh fruit (22%), milk (10%), table sugar (8%), candy/confectionery/chocolate 8%, yoghurt (8%), soft drinks (8%), cakes (6%), vegetables (4%), bread (4%) and cookies/biscuits (3%).	
Spain[37]	Soft drinks 29%; Sweet foods (cakes, spreads, confectionery, chocolate, ice cream) 24%	Sweet foods (cakes, spreads, confectionery, chocolate, ice cream) 21%; Soft drinks 17%
Thailand[41]	In order of consumption: Thai deserts, white sugar, baked deserts/cakes, soft drinks, sweetened or fermented milk drinks, Milo/cocoa, confectionery/candy, ice cream.	
United States[43, 45]	Sweetened beverages (soft drinks followed by fruit juice drinks) sweet bakery products, sugars, confectionery/candy, ready-to-eat cereals, breads, rolls and tortillas.	Sweet foods – cookies and brownies, pies, confectionery/candy, ice cream, ready-to-eat cereals. Sweetened beverages: fruit drinks were the highest source of added sugars followed by soft drinks in children in contrast to soft drinks being highest in adolescents and adults.

*** The estimates provided from the different studies in this table have been derived from varying methodologies. Between study comparison and interpretation should be done with caution.*

9. *What are the advantages and disadvantages of taxing sugar itself?*

In response to growing concerns regarding the health consequences of high sugars consumption, a tax on sugar itself has sometimes been proposed (i.e. what is commonly called 'table sugar': sugar derived from cane and beet). A tax on sugar would apply to 1) sugar at the point of production; 2) sugar imports; and 3) imports of sugar-containing foods [6]. Although excise taxes are usually consumption taxes applied to finished products (for example, cigarettes and not raw tobacco), the diversity of the forms in which sugar is consumed includes (plain) sugar itself, in addition to processed food and beverage products containing sugar. The majority of sugar is consumed in processed foods (see #7).

An advantage of a tax on sugar is that it would be relatively simple to implement at the point of production and import [6]. However, in order to tax all imported foods containing sugar, a system would need to be in place to ensure these are taxed based on their sugar content. The process for this would include establishing a nutrient profiling approach to categorize foods based on sugar content (see #22) to enable differential taxation of higher-sugar and lower-sugar foods [50].

A tax on sugar has a number of disadvantages. First, the wide use of sugar in food preparation and manufacturing (for example, bread, soups, and baked beans) means that a tax on sugar would apply to some foods considered core to a healthy diet, creating inconsistencies with dietary guidance.

The second limitation relates to administrative feasibility, particularly the complexity of defining and differentiating high-sugar foods and beverages [44]. Without an import excise on sugar-containing foods and beverages, a simple tax on sugar production and import would not create consistent and comprehensive price incentives for sugar consumption [6]. It would effectively tax sugar-containing foods in their place of production (i.e. with those manufactured overseas exempted).

Third, the more focused the object of the tax is, the more effective it is in terms of incentivizing consumption change [44]. For example, consumers are more responsive to price changes in SSBs than food in general [51, 52]. A sugar tax would be an appropriate response to addressing externalities and internalities associated with sugar consumption from a tax and (potentially, assuming pass through) price perspective. However, in practice, there is greater potential for strategic pricing by industry and also less clear incentives for consumers to reduce consumption of major contributors to sugar intakes (such as SSBs) [6]. There is also less scope for consumers to change their consumption to avoid the tax, meaning that a sugar tax is likely to be more regressive than a narrower (e.g., SSB) tax.

Finally, free sugars take multiple forms, as described in question #8. As a result, a tax on sugar would apply to only a limited sub-set of the 'free sugars' linked with health concerns. This implies that a true 'sugars' tax would need to apply to all sources of free sugars, including 1) sugars in their whole form, that are consumed directly as well as added to foods – for example, sugar and syrup derived from beet and cane as well as from other sources such as high-fructose corn syrup, and other forms of sugars; and 2) processed foods based on their content of *free sugars*, which would include sugars added from fruits, for example, as well as those listed in point 1. The administration of such a tax would require that free sugar content is notified or labeled.

10. *If sugar is connected to these adverse health outcomes, why only focus on SSBs for excise tax? What are the pros and cons of taxing SSBs?*

SSBs have been the main target of nutrition-related taxation to date. These taxes apply to only one source of sugar in the diet: that consumed in the form of beverages. However, the negative externalities and internalities described in questions #5 and #1 are caused by high consumption of sugar, not only SSBs, so why are SSB taxes more common and appropriate than excise taxes on sugar or all products containing sugar?

First, SSBs are one of the main sources of sugar in the diet (see #7 for more detail) and add no nutritional value to diets. As a result, reductions in consumption of SSBs will reduce sugar consumption overall without the loss of other nutritional benefits. In addition, SSBs have an independent association with weight gain and the risk of chronic diseases [53]. There is a growing

body of evidence quantifying the burden of disease attributable specifically to SSB consumption, which is mainly mediated through Type 2 diabetes mellitus and ischemic heart disease. Estimates of the loss of Disability-Adjusted Life Years due to SSB consumption range from 233,437 in Brazil (2019) and 447 339 in China (2017) [54, 55]. In Mexico, 7% of deaths in 2015 were attributable to SSBs, representing more than 40,000 excess deaths per year [56]. Thus, reducing SSB consumption will also have a direct impact on health outcomes.

Second, consumption of SSBs is relatively elastic, meaning consumers are responsive to price changes. A recent review found a price elasticity of demand of -1.59 and an average reduction in SSB sales of 15% in response to SSB taxes that have been implemented to date [57]. In addition, SSB taxes are usually passed onto consumers in the form of price increases, rather than absorbed through strategic pricing [57]. This means that targeting SSBs through taxation is very likely to result in reduced consumption. It also means that consumers who are concerned about the financial impact of the tax (for example, low-income consumers) are able to shift consumption to limit their tax burden, minimizing regressivity.

11. What different approaches have been used for SSB taxation?

The recent growth in the use of SSB taxes has generated significant experimentation in policy design across the world. The design includes the tax structure and tax rates, while tax structure refers to the type of tax (e.g., specific or ad valorem), tax base, scope of tax and other features (e.g., tiers and thresholds). While specific excise taxes are regarded as the preferred tax type (see #2), in practice, the tax base and other features have varied.[4] An important consideration for SSBs is whether the specific tax should be based on the volume of the beverage or the volume of the sugar, and whether a threshold or tiers based on sugar content should be used. The application of a tax based on the volume of sugar creates an opportunity for manufacturers to reduce their tax burden by reducing the sugar content ("reformulation"), which in turn changes the relative prices of sugar-sweetened beverages and reformulated alternatives for consumers. It is important to note that different approaches to the scope of SSB taxes have different administrative implications, which are discussed in detail in #14.

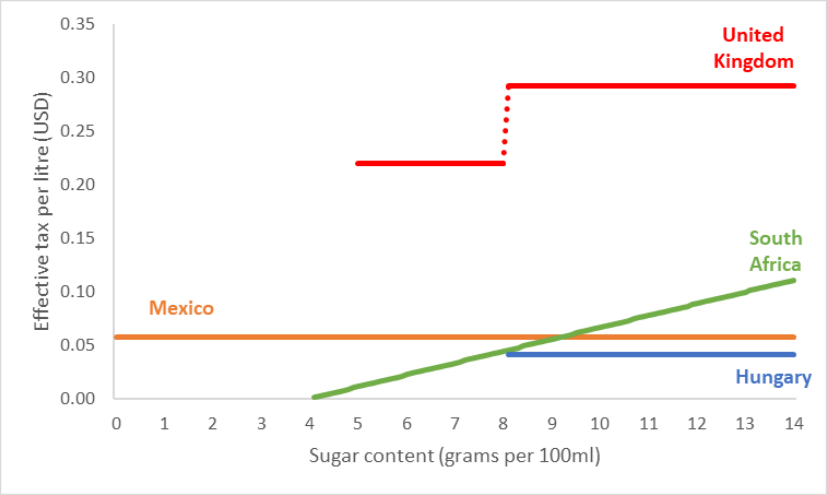
Tax structures that explicitly encourage reformulation have become popular since they have resulted in very large market-level changes quickly. Some prominent examples include:

- Hungary implements a volumetric tax of HUF 15 per liter (USD 0.0436) for beverages with more than 8g of sugar per 100ml. Beverages below the threshold pay no tax. This creates an explicit incentive for producers to reduce the sugar content of beverages below 8g per 100ml.
- The United Kingdom applied a volumetric tax, however, in addition to a threshold (5g per 100ml), it also applies a tiered tax whereby beverages with more than 8g per 100ml pay a higher rate of tax of GBP 0.24 per liter (USD 0.2983), compared to a rate of GBP 0.18 per liter (USD 0.2237).
- South Africa applied a nutrient-based tax, levying a tax of ZAR 0.0210 per gram of sugar per 100ml (USD 0.0012). Furthermore, it applies a threshold of 4g of sugar per 100ml below which no tax is levied.

South Africa's tax varies with sugar content in a linear manner, while the UK's tax varies with the sugar content of beverages discretely. Hungary's tax does not vary with sugar content at all, rather acts in a binary manner. Alternatively, countries can apply the tax similarly to Hungary but without a threshold. Mexico implements a uniform specific tax (i.e. volumetric) of MXN 1 (USD 0.0550). As Figure 2 highlights, the value of the tax does not vary with the sugar content of the taxed beverages.

[4] While specific taxes are preferred, they are susceptible to erosion by inflation. Under the current global inflationary climate, it is prudent to take measures to protect the real value of taxes, including via indexation to inflation. The World Bank GTP has produced a useful Knowledge Note to highlight the challenges and provide policy guidance (Lane et al. 2023).

Figure 2 // ***Comparison of SSB taxes in Mexico, Hungary, South Africa, and the United Kingdom in USD per grams of sugar per 100ml***



Source: World Bank Global Tax Program estimates schools. WHO Regional Office for the Western Pacific Region.

Each of these tax structures generates different incentives for producers. Furthermore, the relative tax rates between tiers as well as the points at which thresholds and tiers are set likely affect the strength of these incentives. For example, a higher threshold or tier generates a larger incentive than a smaller threshold, and larger rate differentials between tiers and/or threshold also increase the incentive. However, if the tier or threshold is too high producers may not be able to reformulate products sufficiently, but if the tiers and/or threshold is too low producers may not have to reformulate the product significantly in order to take advantage of the lower (or no) tax rate.

12. How have "SSBs" been defined for taxation?

The term 'SSBs' refers to non-alcoholic beverages containing added sugars [58]. However, there is significant variation in the beverages that have been subject to health-related beverage taxation. In effect, only some of these are 'true' SSB taxes; although all of the taxes apply to beverages containing sugars, some taxes also apply to non-SSBs. One example is taxes that are applied to 'non-alcoholic beverages', a category that includes SSBs as well as beverages containing non-sugar sweeteners and plain water (see Table 3 for examples). Around a third of health-related beverage taxes are actually non-alcoholic beverage taxes, as they also apply to unsweetened bottled water [59]. Non-alcoholic beverage taxes may raise more revenue, but because of the limited incentives created for substitution between beverages they will have less impact on consumption of beverages with added sugars – and thus health-related outcomes.

Taxes that only apply to beverages with added sugar provide clearer incentives for substitution away from SSBs. These taxes may apply to beverages in a wide range of categories, such as carbonated, still beverages, fruit juices and dairy drinks, but only if they contain added sugars (see columns in the 'tax base' section of table 3, which impact on the inclusions across multiple categories in the 'beverage categories subject to tax' section). Limiting the scope of the tax to SSBs incentives changes to consumption (i.e. to reduce sugar consumption), but may raise less revenue as people switch to untaxed beverages. Many SSB taxes also include beverages containing non-sugar sweeteners within their scope, either through defining broad categories of sweetened beverages and not making a distinction regarding the type of sweetener, or through specific targeting (Table 3). Some SSB taxes also specifically differentiate energy drinks, which combine caffeine and sometimes other stimulants into SSBs and have been linked to risks associated with excessive caffeine consumption, particularly for children [60].

There are two main rationales underlying the exclusion of some relatively common SSBs from taxation: 1) the contribution of some beverages to micronutrient intakes, and 2) data gaps and administrative challenges associated with beverage preparation at the point of purchase or consumption. First, the two main types of beverages that contribute to micronutrient intakes are fruit juice and dairy beverages. Less than half the taxes in place in 2021 applied to sweetened milk-based drinks or unsweetened juices (100% juice). Beverages made from 100% fruit juice, or containing fruit juice, may be excluded from SSB taxation because they contribute to vitamin intake (particularly vitamin C), even though the free sugar content of 100 % fruit juice may be similar or even higher than for SSBs [58]. Dairy drinks also remain a common exclusion, even though these often contain levels of sugars similar to carbonated soft drinks, because of their contribution to intakes of calcium (as well as protein and fat intakes) among children [58].

Second, sweetened beverages that are prepared at the point of purchase or consumption tend to be excluded from SSB taxation. Although powders and concentrates that are intended for consumption as beverages, such as hot chocolate or fruit-drink concentrates are often taxed, it is much more challenging to address the addition of sugar to beverages at the point of preparation – for example, in beverages such as tea, coffee or freshly prepared juices or smoothies. The main concern regarding this exclusion is that in contexts where there is a significant consumption of sweet tea, coffee and/ or other beverages prepared at the point of purchase such as freshly squeezed juices, a tax on pre-prepared beverages (only) will make a minimal contribution to reducing sugar consumed from beverages. However, the variation in content and the addition of sugar at the point of consumption or purchase makes it difficult to apply taxation to these beverages in a way that provides consistent incentives for consumers [58]. Part of the advantage of an excise tax is that while it's a consumption tax affecting prices, it is usually collected very early in the supply chain (e.g., factory gate or point of importation) from a limited number of firms. Having to collect late in the supply chain (at retail) undermines efficiency and may create a large relative burden on both tax authorities and taxpayers.[5]

[5] Note that where something is collected does not de facto mean where the value is assessed. Even though excise is almost always collected early in the supply chain, under ad valorem systems the value can be assessed anywhere in the supply chain even if the tax is collected early in the supply chain for administrative purposes. Generally, ad valorem taxes collected later in the supply chain result in higher effective taxes and may be somewhat easier to establish the value.

Table 3 // ***Selected health-related beverage taxes with different definitional approaches****

	Beverage categories subject to tax								Tax base						Summary of implications of the tax design, informed by evidence for impact
	Carbonated drinks	Still waters	Drink powders/ syrups	Fruit & vegetable drinks	Fruit & vegetable (100%) juices	Dairy drinks	Energy drinks (specifically differentiated)	Cereal-based drinks	Sugar content threshold(s)	Sugar content (per gram)	Any added sugar	Non-sugar sweeteners	High-fructose corn syrup	Any beverage in category	
Kenya	✔	✔		✔	✔	✔	✔	✔						✔	Broad scope including non-alcoholic beverages; unsweetened beverages such as water also taxed
Saudi Arabia	✔						✔							✔	Broad scope including carbonated beverages and energy drinks; unsweetened beverages in these categories are also taxed.
Mexico	✔	✔	✔	✔	✔		✔				✔				Broad scope including beverages containing free sugars (i.e. including 100% juice)
Berkeley	✔	✔	✔	✔			✔				✔				Broad scope including sugar-sweetened beverages
Barbados	✔	✔	✔	✔		✔					✔	✔			Broad scope including sweetened beverages, including non-sugar sweetened; Initial narrower definition exempted powders/syrups which limited tax impact
Philippines	✔	✔	✔	✔							✔	✔	✔		Broad scope including sweetened beverages; higher rate for beverages sweetened with high fructose corn syrup
Chile	✔	✔	✔	✔					✔		✔				Broad scope including sugar-sweetened beverages, with a higher rate for beverages containing sugar at or above 6.25g/100mL
Portugal	✔	✔	✔						✔		✔				Broad scope including sugar-sweetened beverages, with a higher rate for beverages containing sugar at or above 8g/100mL; Explicit exemptions for beverages made from dairy, cereals and fruit and vegetables; Definition of concentrates refined in 2019 to reduce tax avoidance.
France	✔	✔		✔	✔	✔			✔			✔			Narrower scope, with the lowest rate for beverages containing 5-15 g of added sugars/liter increasing to the highest rate for beverages containing 145-155 g of added sugars/liter; also non-sugar sweetened beverages and 100% juice (contains free sugars); substances used for preparation excluded.

	Beverage categories subject to tax								Tax base						Summary of implications of the tax design, informed by evidence for impact
	Carbonated drinks	Still waters	Drink powders/ syrups	Fruit & vegetable drinks	Fruit & vegetable (100%) juices	Dairy drinks	Energy drinks (specifically differentiated)	Cereal-based drinks	Sugar content threshold(s)	Sugar content (per gram)	Any added sugar	Non-sugar sweeteners	High-fructose corn syrup	Any beverage in category	
Thailand	✔	✔	✔	✔	✔		✔		✔			✔			Thailand employs a complex tax structure with four product categories. All four categories apply a specific tax with a tax threshold where the specific tax applies only to beverages containing sugar at or above 6g/100mL, with rate increasing in steep increments at 8g, 10g, 14g, and 18g/100mL. Two of the four categories also employ an ad valorem tax (at different rates) that applies equally to all products within the category. Thus, a product may be subject to the ad valorem tax but avoid the specific tax. For example, carbonated water is included in a category and will attract the ad valorem tax but would fall below the sugar content threshold. While the scope of the tax may appear to be very broad, in practice the use of the thresholds narrows the tax substantially.
United Kingdom	✔	✔		✔					✔						Narrower scope, with a lower rate for beverages containing 5-8g sugar/100mL and a higher rate for beverages containing >8g sugar/100mL.; substances used for preparation excluded.
Hungary	✔	✔	✔	✔			✔		✔						Narrower scope including beverages containing sugar at or above 8g/100mL
Sri Lanka	✔			✔			✔	✔	✔						Narrower scope including beverages containing sugar at or above 6g/100mL
South Africa	✔	✔		✔					✔	✔					Narrower scope, based on sugar content, applied to beverages containing more than 4g sugar/100mL; substances used for preparation excluded.

Sources: [61-91]

13. What are the health implications of different approaches to taxing SSBs?

The health implications of the tax design, including the tax structure, tax rates and the scope of the tax result from the incentives created for both consumers (purchase and consumption change, as well as substitution) and for industry (reformulation and product profile change). SSB consumption is associated with an increased risk for metabolic conditions (namely diabetes and cardiovascular disease), dental caries and some cancers [53].

Taxes that are applied to all SSBs will create consistent incentives for consumers to reduce consumption, without creating (unintended) incentives for substitution with un-taxed SSBs. This indicates that a tax should target all beverages containing sugars, across all beverage categories [92]. Creating consistent incentives also indicates that taxes should not apply to bottled water, which represents a healthier substitute (in terms of the health objective; noting there may be additional objectives related to environmental sustainability that are relevant here).

Further to this, taxes that are applied based on sugar content provide incentives for reduced consumption of high-sugar SSBs, and are thus more likely to reduce sugar consumption (although not SSB consumption per se) through incentivizing both substitution to lower-sugar beverages and reformulation by industry to lower sugar content. This includes taxes that are based on sugar content (per gram) as well as taxes that use a tiered design to apply a higher tax rate to SSBs with a higher sugar content. The differentiation between the objective of reducing sugar compared to SSB consumption was highlighted in by the UK government and underpinned their selection of a tiered tax structure [93]. However, the extent to which overall sugar consumption is reduced will depend on thresholds and tax rates of the different tiers. Higher differentials in tax rates between tiers will generate greater incentives for reformulation, but reformulation to the high end of a lower tier many only minimally reduce sugar content. The sugar content of beverages can vary widely (see Table 4), meaning that there is significant scope for substitution to lower-sugar beverages, and for reformulation. However, the incentives generated depend on the difference in the tax rates applied; larger rates will have a greater impact on consumer and industry responses.

Table 4 // ***Usual sugar content range for different taxed SSB beverage categories***

SSB category	Definition of category	Added sugar content (average)
Syrups used to make SSBs	A concentrated solution of a sweetener (sugar), and other ingredients, including flavourings and preservatives	42-55% fructose and the remaining glucose in US; sucrose (50% fructose and 50% glucose in Europe)
Energy drinks	Typically a soft drink containing a high percentage of sugar and/or caffeine or other stimulant	54-62 g typically found in a 20-oz can 9.2 to 10.5 g per 100 mL
Juice concentrates and powders with added sugar	Fruit juice that has had all the water removed and crushed to a powder. It can be added to water to make a fruit-flavoured drink.	Approximately 32 g in a 250mL cup* 12.8 g per 100 mL
Carbonated drinks	Carbonated beverage that may be sweetened and favoured with a number of ingredients	32gm added sugar in 12oz can 9.0 g per 100 mL (added sugar)
Still drinks: ready-to-drink tea and coffee	Pre-made drinks containing brewed tea or coffee with added flavours such as sugar, milk, creamers, syrups, preservatives	58gm added sugar in 20-oz bottle 9.8 g per 100 mL (added sugar)
Still drinks: flavoured waters	Natural water with added natural or artificial ingredients to enhance the taste	Ranges from 27.5 g in a 500 mL bottle, to 12 g in 500 mL bottle 2.4 to 5.5 per 100 mL
Sports drinks	A soft drink typically containing electrolytes and a high percentage of sugar to restore energy	30 g and 40 g in a 20-oz bottle 5.1 to 6.8 g per 100 mL
Fruit-flavoured drinks	Typically made of water and sugar with add juice or fruit-juice flavouring	24.4 g – 26.6 g in a 200 mL cup 12.2 to 13.3 g per 100 ml
Dairy drinks: flavoured milk	A product made from milk or milk products, sugar and natural or artificial flavourings with or without colourings and preservatives	Mean 9.3 g in a 250 cup; highest 24.0 g in a 250 mL cup 3.7 g per 100 mL (average); 9.6 g per 100 mL (highest)
100% fruit juices	Juice from a fruit without added ingredients	0 added sugar, contains free sugars (approx. 12g/150ml) 8 g per 100ml (free sugars); 0 g per 100 mL (added sugar)
Low sugar sports drinks	A version of sport drink (above) with non-nutritive sweeteners	8 g sugar in 20-oz bottle 1.4 g per 100mL
Low carb energy drinks	A version of energy drinks (above) with non-sugar sweeteners	3-7 g typically in a 20-oz can 0.5 to 1.2 g per 100mL
Carbonated drinks: Diet/low sugar	A version of soda (above) with non-sugar sweeteners	<5 g per 100 mL
Still waters: Unflavoured and unsweetened	Natural water	0 g per 100 mL

Sources: The Diabetes Council.com (https://www.niddk.nih.gov/-/media/Files/Diabetes/NDEP-10-Know-Your-Blood-Sugar-Numbers_508.pdf, https://www.ncbi.nlm.nih.gov/pubmed/10868860); Coyle DH et al (2019) [94]; Malik et al (2022) [53]; Daily Mail (available at: Flavoured water that contains 8 spoons of sugar | Daily Mail Online)

14. What are the administrative implications of different approaches to taxing SSBs?

Different categorizations of beverages as "SSBs" for taxation have different administrative implications. A key issue is the ease of identification of taxed beverages, and there is a trade-off between: 1) simply defined SSB taxes which are broader in scope and may be less effective but more administratively straightforward, and 2) more administratively complex SSB taxes which are narrower in scope and are likely to be more effective.

Simply defined taxes with a broad scope capture a range of sweetened and unsweetened beverages (including beverages containing non-sugar sweeteners), or a subset of easy-to-identify SSBs, such as carbonated soda (see Table x; for example, the approach taken in Saudi Arabia). These taxes are relatively administratively straightforward in terms of identifying taxed beverages; for example, all carbonated beverages, regardless of their composition, are subject to the tax. However, these taxes are less effective at creating the desired incentives for consumers and the SSB industry; for example, a tax on all carbonated beverages would include unsweetened carbonated water.

SSB taxes with a narrower scope capture only beverages containing sugar or other specific products aligned with the policy objective, for example, non-sugar sweeteners (see Table 3 for examples). These taxes differentiate based on sugar content, either through a flat-rate tax applied to beverages with added sugar, or through a tiered approach, or on a sliding scale based on the volume of sugar (see #11). These taxes may be relatively administratively complex, depending on the complexity of identifying taxed beverages; particularly where the tax is not applied to all beverages within a category, but with reference to sugar content, which can vary widely and requires detailed information on sugar content. However, taxes that differentiate based on sugar content are more effective at creating the desired incentives for consumers and the SSB industry (see #12). Of 104 taxes reviewed in 2022, only 3 countries apply purely sugar-specific excise taxes (the Cook Islands, Mauritius, and South Africa) and 18 apply tiered taxes defined by sugar content thresholds (all but one of which are high-income economies) [59]. This indicates the feasibility of SSB taxes with a narrow scope – but also highlights the administrative considerations.

The feasibility of a more administratively complex approach to taxation depends on both tax and other capacities. On the tax side, a commonly used tool for beverage identification for excise taxation is the World Customs Organization Harmonized Commodity Description and Coding System nomenclature (also referred to as Harmonized Tariff System or HS codes), which is used by most countries applying differential rates to define beverage type [59]. These HS codes enable differentiation between higher sugar beverages, including energy drinks, carbonates, and liquid and powder concentrates that can be reconstituted into SSBs, and lower sugar (or excluded) beverages, such as fruit juices, milk-based drinks, beverages with non-sugar sweeteners, and unsweetened water [59]. However, the limitation of HS codes in defining beverages for taxation is the lack of differentiation between sugar-sweetened and beverages with non-sugar sweeteners (i.e. HS Code 22.01 refers to beverages not containing sugar, and HS Code 22.02 refers to Waters, including mineral waters and aerated waters, containing added sugar or other sweetening matter or flavored, and other non-alcoholic beverages, not including fruit, nut or vegetable juices).[6] However, it is possible to create more detailed country-specific codes to differentiate types of SSBs for taxation by performing a national 'split' of HS codes to create clear parameters for the SSBs subject to taxation [92, 95].

More broadly, in contexts where nutrition labeling of sugar content (and differentiating added and naturally occurring sugars) is mandatory, there is more scope for introducing taxes that make specific reference to sugar content. In addition, in contexts with a high proportion of SSB production in the formal sector, and relatively diverse production, industry will have a greater capacity for compliance with narrower forms of taxation. This might also include reformulation and product shifting in response to taxation, to achieve the overall goal of sugar reduction. Finally, the capacity for monitoring and evaluation of compliance with the tax, and the impact of the tax on health and revenue can help to adapt the tax design to improve outcomes.

Further, a potential challenge for SSB taxation is tax collection, which needs to occur across multiple and diverse manufacturers [6]. For example, there can be challenges in collecting taxation from informal manufacturers of SSBs [96]. However, multinational firms dominate in SSB manufacture; globally the top ten soft drink companies alone account for 52% of sales.

[6] Note this is quite different to the situation with alcohol taxation, where HS codes for alcohol align with relatively generalizable alcohol content, e.g. 2203 (beer), 2204 (wine), 2205 (vermouth), 2206 (other fermented beverages), 2007 and 2008 (distilled spirits).

Much domestic manufacturing is in the form of bottling, which is largely a formal sector activity. This means that the feasibility of SSB tax administration is relatively high, as indicated by their wide uptake. The ease of administration of SSB taxes is also affected by the proportion of SSBs consumed that are sold pre-packaged as "ready to drink", rather than prepared on-site (see #12).

To ensure that decisions on the objective of SSB tax design take into account both health and tax administration considerations, it is important for the Ministries of Health and Finance to engage throughout the policy process, in order to reach alignment on the policy objective(s) of the tax as well as the tax design [97]. This includes ensuring that decisions about the object of taxation (i.e. what products to tax) as well as the tax base and potential thresholds are informed by the respective expertise and policy capacities of both ministries.

15. What are the tax revenue implications of different approaches to taxing SSBs?

In most countries, SSB taxes generate less tax revenue than other health taxes like tobacco and alcohol. A recently published World Bank Global Tax Program Knowledge Note "Unpacking the empirics behind health tax revenue" attributed this to relatively lower tax rates, more elastic price elasticity of demand, narrow scope of tax in many countries, and the common use of tax structures that generate more supply-side responses.

The more elastic the demand, the larger the decline in consumption for the same price increase, and thus the lower the revenue yield. A systematic review shows the price elasticity of SSBs is -1.59 [57], while comparable estimates for cigarettes were found to lie between -0.2 and -0.6 in HICs and between -.02 and -0.8 in LMICs [98], and beer, wine and spirits -0.3, -0.6, and –0.65, respectively [99]. As discussed in question #12, the definition of SSBs for the purpose of taxation can have a significant impact on revenue-raising potential. Taxes that generate incentives for industry to reformulate are likely to result in the least revenue gains from taxation, or declining revenue over time, depending on the extent to which consumption of beverages with the lowest taxed tier continues.

When the tax is based on the sugar content rather than the volume of the beverage, either through linear taxes or by using tiers or thresholds this generates an incentive for firms being able to lower their tax liability by reducing the sugar content in their products [100]. Alternatively, firms may respond by shifting advertising from higher to lower sugar products.[7] South Africa's SSB tax is based on the grams of sugar per 100ml that exceed a threshold of 4g/100ml. This generates an incentive for firms to lower sugar content to reduce their tax liability. Since implementation, excise revenue from the SSB tax declined from ZAR 3.3 to 2.3 billion (2018/19 and 2021/22 fiscal years) even though the tax rate has remained unchanged [101]. Furthermore, this also indicates a significant decline in the volume of sugar consumed from SSBs, thus achieving the policy goal.

Similar evidence on reformulation has been observed in the UK where a tiered system exists with a threshold below which no tax is paid (5g/100ml), and a tier above which a higher tax is paid (8g/100ml). Initial estimates were that the tax would raise GBP 520 million, with revenues declining over time as both producers and consumers were expected to shift behavior [102]. The tax was announced nearly two years in advance of implementation to provide producers with sufficient time to reformulate products to reduce sugar content to reduce or eliminate their tax liability. The market response was significantly greater than initially anticipated, with dramatic reformulation occurring even before the tax was implemented, resulting in a reduction in the official revenue estimate to GBP 240 million [103]. Fifty days prior to implementation, the proportion of beverages with sugar content above the threshold had declined by 42 percent, whereas 50 days after implementation the proportion of beverages with sugar content above the threshold had declined by 67 percent [104]. The tax raised GBP 318 million in the first year, highlighting the revenue trade-offs that can occur when taxes are structured to incentivize reformulation by reducing sugar, and therefore health impact [105].

[7] This has not been studied on SSBs, but it has been shown with similar tax structures on beer in South Africa where the change of the tax base (from volume to alcohol content), combined with tax increases resulted in large declines in total alcohol consumption from beer as the average strength of beer declined. This coincided with a shift in advertising towards lower alcohol beer (see Blecher, 2015).

The ease of substitution to untaxed beverages by consumers also has implications for revenue. Taxes that apply to only a limited selection of SSBs will increase the opportunity for consumers to avoid taxation while continuing to consume SSBs. In contrast, taxes that are broad in scope (e.g., those that include bottled water) will limit substitution opportunities and have higher revenue-raising potential. From a health perspective, however, healthy alternatives such as bottled water should, where possible, be excluded from health-related beverage taxes.

16. What is the evidence that reformulation occurs in response to SSB taxation?

Emerging evidence indicates that the industry has responded to SSB tax measures, particularly those based on sugar content, by reformulating beverages. Beverage reformulation has followed tiered taxes introduced in the UK, Portugal and South Africa [57]. Reformulation has included reductions in sugar content and replacing sugar with non-sugar sweeteners. Companies also appear to be shifting their overall product portfolio and marketing strategies towards lower-sugar products, including those containing beverages with non-sugar sweeteners [106, 107].

The UK Soft Drink Industry Levy was designed to incentivize the reformulation of SSBs; a two-tiered tax rate was used, based on sugar content (£0.24 per liter for drinks with 8 g added sugar per 100 ml and £0.18 per liter for drinks with 5-8 g added sugar per 100 ml). In response to the tax, 6 of the top 10 companies reduced sugar content or removed more than 50% of the high- and mid-sugar products from their portfolios—leading to a 72% reduction in high- and mid-sugar products by 2018, when the tax was implemented. The average sugar content of soft drinks declined from 4.4 g/100 ml in 2015 to 2.9 g/100 ml in 2018 (34%), with the greatest decrease in 2017–2018 [108]. In 2016 the UK tax only applied to a small percentage of the soft drinks in the UK grocery market, with the majority of untaxed beverages having a sugar content just under the threshold [104]. There has been no analysis to date of changes in the non-sugar sweetener content of beverages associated with the tax. However, industry data indicates that 'no calorie' drink sales have increased every year for more than a decade, in part due to reformulation by soft drinks manufacturers to reduce sugar from their products, such that the share of 'no calorie' drinks in Total Soft Drinks market sales in 2020 was 69% [109]. The industry also reports that between March 2014 and March 2020, take-home sugar from soft drinks fell by 43.5% [109].

The single-tiered tax implemented in South Africa also resulted in reformulation. Following the introduction of the SSB tax (2.1c per gram of total sugar in excess of 4 g/100 ml), an analysis of supermarket scanner data found that 17% of taxable items had been reformulated to lower sugar concentration (up from 5.2% in the interim period between announcement and implementation of the tax) [110]. The sugar content of beverage purchases fell by 5 g/capita/day overall, a 32% decrease, and reformulation accounted for 34% of that change [110]. A study on SSB prices following the tax also found evidence of product reformulation, noting significant price increases among the brands that reduced their sugar content [86]. There has been no analysis to date of changes in the non-sugar sweetener content of beverages associated with the tax.

In Portugal, a special consumption tax was applied to SSBs with more than 80 g of sugar per liter in 2017, with the aim of reducing free sugar consumption and encouraging reformulation [111]. A preliminary evaluation found that the volume of taxed beverages purchased declined by 41%, which was attributed to reformulation [112]. An analysis in 2019 (just before the change to a tiered tax) found that more than half of the samples reduced the amount of sugars and added or increased the share of non-sugar sweeteners, while a quarter (mostly branded products) did not change sugar content or non-sugar sweetener content. A few samples had reduced sugar content without adding any other sweetener, while a few had added non-sugar sweeteners without reducing sugar content [111]. The profile and amount of sugars were distinct between groups with "colas" and "juice drinks" showing the highest variability between brands, being mostly represented by fructose and glucose. Non-nutritive sweeteners were present in most samples (85%), often in mixtures and very dependent on the type of drink (see Box 2 for terminology). Between 2008 and 2019, non-nutritive sweeteners in cola increased by between 50 and 250 mg/L; juice drinks increased by between 10 and 100 mg/L; iced teas increased by approximately 50 mg/l (from zero) and lemon drinks increased from zero to up to 100 mg/L [111].

One study further suggested that reformulation could also be influenced by proposals for a tax – in effect, preparatory or pre-emptive reformulation. In Colombia, during the period when the SSB tax legislation was under discussion, an analysis of 36 beverages from the top-selling brands found a substantial decrease in the median sugar content of beverages, from 9.2 g per

100 mL to 5.2 g per 100 mL, and an increase in the percentage of beverages containing NNS, from 33% to 64% between 2016 and 2018 [113].

17. How about the impact of these SSB taxes? What do we know about what happens to SSB consumption when reformulation occurs?

There is some evidence for the consumption impacts of reformulation in response to SSB taxes from the UK, Portugal, and South Africa. Following the introduction of the tax in the UK, the volume of sugars sold from soft drinks declined by 4.6 g per capita per day (30% reduction) [108]. A preliminary evaluation in Portugal found that sugar intake from taxed beverages declined by 15%, attributed to reformulation [112].

In South Africa, the price of reformulated products increased [114] – the most recent estimate puts the change at R1.08 and R1.16 per liter for all reformulated beverages and beverages reformulated below the 4 g/100 ml threshold, respectively [110]. Decreases in sugar content attributed to reductions in the volume of taxable beverage purchases were slightly offset by increases in the volume of non-taxable beverage purchases, although mitigated by some reformulation of non-taxable beverages. There were some differences by income observed: Middle-income households tended to switch towards both taxable and non-taxable beverages that were lower in sugar, whereas higher-income households tended to switch towards lower-sugar taxable beverages but higher-sugar non-taxable beverages (such as milk-based drinks without added sugar) [110] A dietary analysis among South African young adults found that behavioral change accounted for reductions of 24% in energy, 22% in sugar, and 23% in volume, while reformulation accounted for additional reductions of 8% in energy, 9% in sugar, and 14% in volume from taxed beverages [115].

18. How about non-sugar sweeteners? What are they, and are they safe?

A range of terms are used to describe non-sugar sweeteners, which are compounds that taste sweet but provide minimal or no carbohydrates or energy. These are sometimes called artificial sweeteners, no-calorie or non-nutritive sweeteners, to distinguish them from sugar compounds (found in refined sugar, honey, and other foods) that provide energy. With a rise in sugar alternatives derived from plants, some of which contain small amounts of energy, the terminology non-sugar sweeteners is sometimes used as a broader term, which encompasses both these plant-derived sugar alternatives and non-sugar sweeteners. When considering the substitution from SSBs to beverages with non-sugar sweeteners as well as the reformulation of SSBs to reduce sugar, often by including non-sugar sweeteners as a replacement, consideration needs to be given to the net effect (i.e., the harm that may be generated by non-sugar sweeteners needs to be offset against the harm reduced by the reduction in sugar).

The Codex Alimentarius Commission *General Standard for Food Additives*[8] sets maximum limits for the content of non-sugar sweeteners in foods and beverages, and the United States Food and Drug Administration has listed a range of high-intensity sweeteners as safe for consumption and provided *Acceptable Daily Intakes.*[9] Overall, there is a consensus that non-sugar sweeteners are safe to consume, within these limits. However, there are levels at which the consumption of non-sugar sweeteners may generate harm and significant attention has been focused on establishing these levels in recent years. The acceptable daily intakes vary widely between different types of non-sugar sweeteners – for example, from 0.3 milligrams per kilogram body weight per day for Neotame to 50 milligrams per kilogram body weight per day for Aspartame.

The WHO has issued formal guidance that suggests that non-sugar sweeteners not be used as a means of achieving weight control or reducing the risk of noncommunicable diseases [116]. A systematic review conducted to underpin this guidance found mixed evidence that included some positive health outcomes and some negative [117]. On the positive side, non-sugar

[8] https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B192-1995%252FCXS_192e.pdf

[9] https://www.fda.gov/food/food-additives-petitions/additional-information-about-high-intensity-sweeteners-permitted-use-food-united-states

sweetener consumption was associated with decreased body weight, decreased BMI, decreased energy intake and decreased sugar intake. However, other studies found that non-sugar sweetener consumption was associated with an increased risk of HDL cholesterol, adiposity, diabetes, all-cause mortality, cardiovascular disease (CVD), bladder cancer and pre-term birth [117].

The evidence base on the health implications of non-sugar sweetener use in beverages, more specifically, is smaller but less positive. Two recent observational studies found that consumption of beverages containing non-sugar sweeteners was associated with a higher risk of stroke and dementia [118], as well as particularly small artery occlusion stroke subtypes, coronary heart disease, and all-cause mortality [119]. A review found that evidence from RCTs does not clearly support the intended benefits of non-nutritive sweeteners for weight management, and observational data suggest that routine intake of non- nutritive sweeteners may be associated with increased BMI and cardiometabolic risk [120]. A study in Portugal found that some reformulation of SSBs could lead to potentially high levels of consumption for children, who have lower acceptable daily intakes; in particular, an 8-year-old consuming two cans of soda per day could ingest 73% of the acceptable daily intake for cyclamate [111]. This suggests that it is critical to monitor the levels of non-sugar sweeteners in beverages following the implementation of an SSB tax.

19. Should SSB taxes be designed to encourage a shift to beverages containing non-sugar sweeteners?

While reformulation with non-sugar sweeteners can lead to immediate reductions in sugar consumption in the form of SSBs, public concerns regarding the health impacts of non-sugar sweetener consumption mean that policy makers must balance these dynamics in considering the extent to which SSB tax policy design incentivizes such reformulation. Reformulation with non-sugar sweeteners can support one common objective of SSB taxes, which is to reduce the population's sugar intake. Excessive sugar consumption is strongly associated with an increased risk of poor health outcomes (including those related to diabetes, cardiovascular disease, and cancer) [24, 26, 121]. However, over the past few decades, concerns about the impact of non-sugar sweeteners on health have been raised – including specifically regarding potential unintended, long-term consequences of SSB taxes that result in increased population-level consumption of beverages containing non-sugar sweeteners.

Several reviews and meta-analyses have found similar levels of risk for diet-related diseases arising from the consumption of both SSBs and beverages containing non-sugar sweeteners. These include significant associations between high consumption of beverages sweetened with sugar or non-sugar sweeteners, and a higher risk of CVD mortality and all-cause mortality [122, 123] and obesity [124]. Increased consumption was also associated with increased risk of type-2 diabetes, CVDs, and all-cause mortality, probably resulting from changes in sugar metabolism and weight gain [125-127].

However, other studies have found less clear evidence for risk associated with the consumption of beverages containing non-sugar sweeteners, compared with SSBs. One review found that a high intake of beverages containing non-sugar sweeteners was positively associated with total and CVD mortality only among women [128], and an observational study found that the increased mortality associated with ASB consumption did not persist after excluding deaths in the first 2 years of follow-up, suggesting reverse causation [129]. Only one systematic review and meta-analysis identified in this scan of the literature found that using low- and no-calorie sweetened beverages as an intended substitute for SSBs was associated with small improvements in body weight and cardiometabolic risk factors without evidence of harm [130]. There is also some indication that non-sugar sweetener beverage consumption could be associated with a lower risk of dental caries than SSB consumption [117].

Informed by this evidence, encouraging reformulation with non-sugar sweeteners should be approached with caution, from a health perspective. The health goals of reductions in SSB consumption may not be achieved with reformulation that results in beverages containing high levels of non-sugar sweeteners. However, there is so little information on the composition of reformulated beverages in the UK and South Africa, where the strongest evidence for reformulation exists, that it's not clear whether reformulation always results in increased non-sugar sweetener content and consumption. However, if incentivizing sugar reduction can be done with minimal changes to non-sugar sweetener content, then this would be a positive outcome for health. It is critical that non-sugar sweetener content be monitored following the introduction of an SSB tax. The scope of SSB taxes often includes beverages containing non-sugar sweeteners (see #12).

20. What are the likely macro-economic impacts from sugar and SSB taxes?

Many opponents of sugar and SSB taxes argue against them on the grounds that the taxes will cause significant harm to sugar and SSB supply chains, including for sugar production, and the manufacturing, logistics, and retail sectors. They argue that this will result in job losses and contribute to higher inflation. The potential macro-economic impacts, even where less than estimated, can be influential on political support for SSB and sugar taxes. Although there is little evidence to support any macro-economic impacts from SSB taxes, considering complementary policy opportunities to support diversified production and transitional employment may these can mitigate these concerns.

For countries with major sugar production, taxing sugar may negatively impact the livelihoods of sugar producers [131], who are often poor and relatively unskilled (see for example [132]). Employment from sugar production in specific countries can be significant (Table x); for example, the sugarcane industry employs 25 percent of the rural workforce in Brazil [133]. However, it is important to note that not all sugarcane is destined for human consumption. In Brazil, for example, only around 20% of production is destined for high-sugar foods, compared to about 60% going to biofuels [131]. This means that there is often significant scope for reductions in sugar consumption with minimal impacts on farmers, through shifts in commodity markets as well as opportunities for alternative livelihoods [131]. Globally there is significant production and trade of sugar-containing products as well as raw sugar, with many countries both exporting and importing sugar as well as sugar-containing foods and beverages [134, 135].

Table 5 // ***Employment in the sugar industry (direct and indirect) in the top ten sugar producing countries worldwide***

Top ten sugar-producing country	Employment estimates (persons)*
Brazil	712,000
India	More than 35 million people are employed by the sugar industry in India, with another 350,000 workers employed indirectly through ancillary activities.
European Union (EU)	In 2018, there were over 139 thousand sugar beet growers in the EU, while the number of persons employed in the sugar industry was approximately 30 thousand
Thailand	800,000
China	450,000
United States	151,000 directly and indirectly
Russia	Not available
Pakistan	1.5 million
Mexico	400,000 jobs (over 2.2 million people depend on the industry for a direct job and indirectly for more than 12 million people.
Australia	40,000 directly and indirectly

**Source of employment estimates for each country: Brazil: Source: RAIL 2019/2020) Available from: sugarcane.org; India: (Source: Brandon Gaille Small Business & Marketing Advice website; EU: CEFS, 2018; Thailand: Sugar Asia magazine, 2023; China: FAO; US: https://sugaralliance.org/; Pakistan: Sugar Mills in Pakistan: An Overview | Graana.com; Mexico: Aguilar-Rivera et al (2012); Australia: Industry Information: Sugar Australia*

The manufacture of sugar-containing foods and beverages is led by several key multinational companies [133]. There is limited evidence for the specific impact of nutrition-related taxes on industry revenue, gross domestic product, government revenue and employment, and no robust evidence for the negative macroeconomic impacts of diet-related fiscal policies [136]. Studies that focus on sector-specific impacts have found some reductions in employment following taxes, but the methodologies used in these studies are limited and they do not consider net employment or changes in market strategy (including reformulation) in response to taxation [136].

Interventions to reduce sugar consumption – globally – are impacting sugar markets globally: sugar sector market growth projections have slowed down, including as a result of reduced corporate procurement and consumer preferences for lower sugar intake [133]. In addition, the growth projected for the sector is attributed to increasing consumption of caloric sweeteners, processed products, sugar-rich confectionery and soft drinks, rather than table sugar, suggesting that interventions targeting high-sugar foods and beverages rather than sugar would continue to slow sector growth [133].

QUESTIONS ON OTHER NUTRITION-RELATED TAXES AND THEIR DESIGN

21. Beyond SSB taxes, what other taxes have been applied to support healthier diets/ nutrition?

Ten countries around the world have introduced food taxes explicitly with the objective of improving diets and health (Table 6). These taxes use different approaches to defining unhealthy foods (see #22) and have been applied to foods including confectionary, processed foods, and fats/oils.

There is strong evidence that food prices affect consumer purchasing and consumption behavior. Taxes are one of the key policy instruments through which governments can affect prices, although the impact of taxes on prices is mediated by the price elasticity of demand, income elasticity, tax pass through and market structure. Food taxes with a health objective have been consistently associated with higher prices and reduced sales [16]. Evidence from taxes implemented in Mexico, Hungary, Denmark, the United States of America, and Finland indicates consistent results of increased prices and reduced sales of taxed products. However, there were mixed findings on how purchases of substitutes or untaxed products changed, and no studies examined impacts on consumption of taxed products, dietary intake, BMI, and NCDs.

The limited uptake of unhealthy food taxes in part reflects the administrative and health trade-offs between broad and narrow taxes (see #12 for a detailed discussion regarding SSB taxes). Narrower food taxes that target a very specific subset of foods associated with health harms are likely to be more effective but are more challenging from a definitional and thus administrative perspective. For example, the 8% tax on non-essential energy-dense foods in Mexico was narrowly targeted to a specific sub-set of less healthy foods and reduced purchasing of these foods by more than 5% [137]. However, the use of a complex calorie-based threshold on only a sub-set of foods meant that there were some less healthy categories not subject to taxation, such as ice cream, and also that administration was challenging [137]. Broader food taxes, although administratively more straightforward, are likely to create fewer clear incentives for consumers. For example, the 'fat tax' implemented in Denmark, which was rescinded after one year, was criticized for its application to unprocessed foods and lack of differentiation of traditional cooking ingredients [138]. Broader taxes on foods can also become politically sensitive due to concerns related to affordability and cost-of-living. In contrast to a product like tobacco, food is essential to life and makes up a significant proportion of household expenditure for all households.

Table 6 // ***Examples of unhealthy food taxes worldwide (national)***

Country	Year	Tax type	Tax structure	Uniform or differentiated	Tax rate	Taxed products (food and nutrients only)
Bermuda	2018/ 2019	Tariff	Ad valorem	Uniform	50% (2018)/ 75% (2019)	Sugar confectionery and pure sugar imports (2018)/ all food products containing cocoa and added sugar
Colombia	2023	Excise	Ad valorem	Uniform	10%	Ultra-processed foods: those with high added sugars, salt, and saturated fats, including sausages, cereals, jellies and jams, purees, sauces, condiments, and seasoning.
Dominica	2015	Excise	Ad valorem	Uniform	10%	Sweets, candy, chocolate bars,
Ethiopia	2020	Excise	Ad valorem	Uniform	30% on non-hydrogenated fats and oils; 40% on hydrogenated fats and oils; 50% on margarine.	Margarine and hydrogenated fats and oils with >40% sat. fats or >0.5% trans fats/100 g. non-hydrogenated fats and oils with >40% sat. fats/100 g or if sat. fat not indicated.
Fiji	2012	Excise	Ad valorem	Uniform	32%	Imported palm oil
French Polynesia	2002	Tariff	Ad valorem	Tiered	XPF40/litre	Confectionery and ice cream
Hungary	2011	Excise	Ad valorem	Uniform	Range from HUF/liter or Kg 70 to 500.	Pre-packaged products with added sugar, chocolates, sugar-sweetened cocoa powder, salted snacks, condiments, jams
Mexico	2014	Excise	Ad valorem	Uniform	8% on non-essential energy-dense food >275kcal/100 g	Nonessential energy-dense food >275kcal/100 g
Norway	1981 (revised 2018)	Excise	Specific	Uniform	Chocolate and sugar products: 36.92 NOK/kg (approx. $US 4.69); Sugar: 7.81 NOK/kg (approx. $US 0.94)	Sugar, chocolate: Sugar, icing sugar, rock candy (not applied to products where sugar is the ingredient of SSBs and confectionery).
Tonga	2016/20 17	Tariff	Specific	Uniform	TOP 2/ kg (approx. $US 0.9) on animal fat products & instant noodles; TOP 1.5/kg (approx. $US 0.7) on turkey tails & ice cream	Animal products, ice cream, instant noodles

Note: Denmark introduced a fat tax in 2011 but rescinded it in 2012, which taxed food according to saturated fat content

Source: (1). Sassi F, Belloni A, Roche M & Olney (2021). Taxing foods high in fat, salt & sugar: a report prepared for Resolve to Save Lives Imperial College London. (2). Pfinder M, Heise TL, Hilton Boon M, Pega F, Fenton C, Griebler U, Gartlehner G, Sommer I, Katikireddi SV, Lhachimi SK. Taxation of unprocessed sugar or sugar-added foods for reducing their consumption and preventing obesity or other adverse health outcomes. Cochrane Database Syst Rev. 2020 Apr 9;4(4):CD012333. doi: 10.1002/14651858.CD012333.pub2. PMID: 32270494; PMCID: PMC7141932. (3) World Cancer Research Fund International (2019)

22. What approaches to defining unhealthy food have been used for taxation?

One of the key design considerations for food taxes is defining the object of taxation – specifically, categorizing foods as unhealthy and healthy for the purpose of taxation. Different definitional approaches have included applying taxes based on energy density, nutrient profiling, level of processing, and the presence of a specific nutrient(s), which are outlined below.

A tax based on the energy density of foods (in this case "high caloric foods") has been introduced by Mexico. Energy density refers to the energy content of food, with reference to the overall quantity of the food. This can be an indicator of how healthy a food is, particularly for packaged and processed foods. For example, fresh and high-fiber foods often have low energy density. However, energy density is less useful for minimally processed foods that are used in composite form or in combination, such as butter or oil. A combination of energy density and nutrient density is often used to assess how healthy packaged foods are (i.e. processed foods that are energy-dense and nutrient-poor can be considered unhealthy). Energy-dense foods are linked to weight gain [139]. The 8% tax on nonessential foods with an energy density of 275 kilocalories/100 grams or above in Mexico was associated with reduced consumption of the taxed foods [74]. A strength of taxes based on energy density is that calorie (energy) labeling is often mandatory in back-of-pack labels, and in several countries is now mandated in restaurants, which makes the administration of a tax relatively straightforward, since the required information is provided on the food [140].

Nutrient profiling models assess the relative healthfulness of food based on an analysis of the content of multiple nutrients – for example, saturated fat, salt and sugar – and have been used to underpin taxes by Hungary [141] and Tonga.[10] Meta-analyses show that reducing the consumption of specific nutrients associated with NCDs can reduce population risk, specifically salt [142], sugar [143] and saturated fat [144]. A strength of nutrient profile-based taxes is that they create incentives for reformulation because if foods are reformulated to fall below the thresholds assigned to a given nutrient(s), the tax no longer applies [145]. The tax introduced in Hungary targets salt and sugars, and has been found to decrease the purchase of processed foods [141].

A tax on ultra-processed foods, which are defined under the NOVA classification as food products formulated mostly or entirely from substances extracted from foods or derived from food constituents, has recently been introduced by Colombia.[11] Ultra-processed food consumption results in excess calorie intake and weight gain [146] and is associated with obesity and diet-related NCDs [147]. The administration of an ultra-processed food tax uses ingredient labeling for the identification of foods; all ultra-processed foods are packaged, so should have clear labeling of ingredients. Ingredients unique to ultra-processed foods include food substances never or rarely used in kitchens (such as high-fructose corn syrup, hydrogenated or unesterified oils, and hydrolyzed proteins), or classes of additives designed to make the final product palatable or more appealing (such as flavors, flavor enhancers, colors, emulsifiers, emulsifying salts, sweeteners, thickeners, and anti-foaming, bulking, carbonating, foaming, gelling and glazing agents) [148].

Taxes on single nutrients have also been proposed for fat, salt, and sugar. Denmark implemented a 'fat tax' in 2011, which taxed food according to saturated fat content. The tax was repealed in 2012, with subsequent analysis indicating that saturated fat intake had declined while the tax was in place by 10-15% [149, 150]. However, there has been little uptake of single nutrient taxes, in part due to the complexity of their administration and the wide scope of the tax base. A nutrient tax requires detailed information regarding the nutrient composition of foods, which is often required on the package of processed foods, but not always, and is often not provided for minimally processed or unprocessed foods. As such, a database of nutrient composition with thresholds to indicate taxability must be created and maintained to identify foods subject to taxation.

23. How can food labeling support food-related taxation for health?

Assessing whether a given food is classed as 'unhealthy' and is subject to taxation requires information on the nutrient composition in relation to relevant thresholds, and/or ingredients necessary for categorizing foods (e.g. whether they are

[10] https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099600006252241446/p153778029a08d022089690f5f980532db5

[11] https://healthpolicy-watch.news/colombia-votes-to-tax-junk-food-and-sugary-drinks/#:~:text=Ultra%2Dprocessed%20foods%20facing%20taxes,%2C%20and%2020%25%20in%202025

classed as ultra-processed). Food labeling can support this identification. Nutrient declaration labeling – which is recommended under Codex Alimentarius Commission Guidance[12] – provides a reference point for identifying foods subject to nutrient-based taxes (including nutrient profile-based taxes and energy density-based taxes), and ingredient lists (which are recommended as mandatory) provide a reference point for identifying ultra-processed foods.

Front-of-pack interpretive nutrition labels – such as Nutri-score, the Health Star Rating or warning labels – can provide a straightforward reference point for identifying foods subject to taxation based on more complex nutrient profiling models. For example, a simulation of a tax using Chile's nutrient profiling model used for the warning labeling suggests that taxation would create a further disincentive for consumption (the labeled food and beverage groups other than fish and meat were price elastic), and suggested that its application would be fairly straightforward administratively [151].

In situations where food labeling is minimal, a potential option is for taxation to be applied to broad food categories that include a high proportion of unhealthy foods, such as confectionary or baked goods. There is then an opportunity for manufacturers to apply for exceptions for foods that are below the relevant thresholds for given nutrients or not ultra-processed (depending on the nature of the concern), and thus not subject to taxation. In other words, the tax is applied across the category unless an exception is applied for and granted. However, this approach still requires clear definitions and categorization of foods, and it has not been applied in practice.

24. What are the likely substitution effects arising from health-related food taxes, and implications for policy?

Understanding substitution patterns resulting from unhealthy food taxes is critical for optimal tax design. The impact of the energy-dense food tax in Mexico on energy intakes (and therefore obesity) was limited by substitution to non-taxed foods that more than compensated for the decrease in energy from taxed foods (by about 30%) [74]. This was in part due to the relatively small contribution of taxed foods to overall energy consumption – and notably does not take into account the overall nutrient profile or relative healthfulness of the foods substituted – but it highlights the importance of considering substitution of taxed foods within diets overall in tax design. There is little evidence to date on substitution related to other food taxes currently in place, in part because existing taxes have been relatively small.

Cross-price elasticities (the impact of a change in the price of one food on the purchasing of another food) can capture these substitution effects. However, there are limited estimates of these elasticities in this context. A systematic review indicated that food price elasticities vary by country income level. For example, in low-income contexts, the largest cross-price elasticities were from cereal price increases: a 10% price increase reduced consumption of cereals by 6%, and increased consumption of fruit and vegetables, fish, dairy, fats and oils and sweets by 4% [152] . In middle-income countries, animal-source foods were most responsive to price changes.

Substitution effects can also be mitigated by reformulation; if taxes provide clear incentives for reformulation they can generate shifts to 'healthier' versions. However, there is a risk of unintentional outcomes from reformulation that incentivizes ultra-processing in an effort to reduce the content of nutrients of concern, which may not achieve the intended health benefits.

Policy coherence is a critical consideration for effective unhealthy food taxation, particularly coherence with dietary guidelines. Taxes should not apply to core food groups recommended in dietary guidelines. Some broad-based food taxes are potentially inconsistent with dietary guidelines, where taxes apply to core foods that are identified in dietary guidelines as forming part of a healthy diet. For example, fat taxes that apply to dairy, meat and other foods that contribute substantially to nutrition can generate policy incoherence, as they create disincentives for consuming unprocessed or minimally processed foods that form part of a healthy diet. In addition, existing policy measures that influence price within the supply chain – particularly subsidies and price controls – should be examined in relation to proposed unhealthy food taxation.

[12] https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXG%2B2-1985%252FCXG_002e.pdf

25. What are the political and industry-related implications of health-related food taxation?

Food is a significant sector of most economies, and also a significant component of household expenditure. As a result, food taxation is of interest to both industry and the wider public, and it is important for politicians to be aware of potential impacts.

At the household level, there is significant variation by income on the proportion of household expenditure on food. Globally, poor households spend up to 70% of their income on food, compared to around 15% in the wealthiest households [153]. Growing concerns regarding food affordability globally over the past few years have increased equity concerns regarding food taxation. Globally, higher food prices were estimated by the International Monetary Fund to have added 6 percentage points to consumer food inflation in 2022 [17].

Overall, food is very price inelastic (meaning that expenditure on food overall changes little in response to food price changes). However, the price elasticity among sub-categories of food can vary. For example, food consumption is most sensitive to changes in prices in low-income countries, particularly for meat, fish, and dairy; in contrast to cereals, fats, and oils, which are least price-sensitive [152]. Sensitivity to price changes is lowest in high-income countries [152]. This means that taxes on food affect a greater proportion of income among low-income households and also households in low-income countries, but also that these households are more likely to respond to taxes by shifting their consumption where possible.

Very targeted unhealthy food taxes that apply to foods with clear substitutes and/or non-core foods with a clear link to the health risk, may reduce potential regressivity compared to more broad-based taxes that impact the price of a wide range of foods. This is because they enable consumers to limit their tax burden by shifting consumption. Equity impacts will depend on the marginal regressivity; the extent of reduced consumption of the taxed foods, with or without substitution to untaxed foods. A well-designed tax that supports behavior change could effectively be progressive at the margin, due to the higher price sensitivity of lower-income consumers. Research into carbon-based food taxation (i.e. environmental taxes on foods that reflect the carbon footprint) similarly indicates that broad taxes tend to be slightly regressive and can have more effect on specific social groups, but that more targeted taxes that exempt basic food products can mitigate this regressivity [154].

There is limited evidence regarding whether consumers substitute with healthier foods in response to taxation. However, cross-price elasticities (the impact of a change in the price of one food on the purchasing of another food) can capture substitution effects, and overall, there is potential for targeted food taxes to encourage consumers to shift to healthier consumption patterns [152, 155]. For example, in low-income contexts, an increase in the price of sweets by 10% reduced consumption of 7.4%, with an increase in consumption of all other foods by approximately 1% each [152]. In high-income countries, an increase in the price of fats and oils by 10% was associated with a reduction in their consumption of 4.2%.

There is also limited evidence available on the macro-economic impacts of food-related taxation for health, because of the limited number of taxes that have been implemented and evaluated. A review published in 2022 identified two studies that examined unemployment related to food taxation, with one reporting a decreasing pattern of national unemployment, and one small sub-sector-specific study reporting lower employment [16]. One important factor in understanding potential economic impacts is the number of sub-sectors impacted by taxation. A tax impacting a narrow sub-sector is likely to have more limited economic impacts, due primarily to the scope for industries to diversify and reformulate. For example, the tax on a limited sub-set of high-energy-density foods in Mexico. In contrast, a broader tax affects multiple sub-sectors. For example, the fat tax implemented in Denmark significantly affected the meat, dairy, bakery, confectionery, and oil industries. The result was concerted industry opposition to the tax, which was removed based on its business impacts [149].

The dynamics related to the formality of the food system are also likely to impact the industry impact and responses. In countries with substantial informal food systems, the impact of food taxes must consider the nature of potential substitution between taxed food in the formal food system, and untaxed food in the informal food system. For example, in situations where the informal food system largely provides fresh and minimally processed foods, there is limited potential for substitution of taxed products. In situations where there is significant highly processed food high in fat, salt and sugar that is sold in the informal food system, there will be potential for substitution. This dynamic will also influence industry opposition to taxation [96].

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