

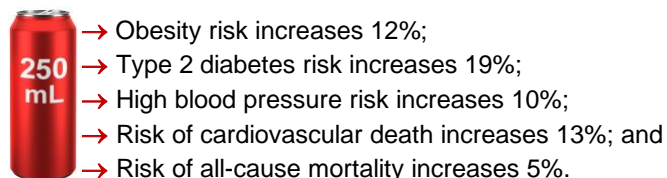
# Taxing sugary drinks: A fiscal policy to improve public health

Sugary drinks are a key driver of modern surges in nutrition-related diseases worldwide, including obesity, type 2 diabetes, high blood pressure, and heart disease. These and other non-communicable diseases are now the leading causes of disability and death in the world.<sup>1</sup> To curb consumption of sugary drinks and their associated health, economic, social, and environmental harms, over 60 countries and smaller jurisdictions have implemented taxes to raise their prices, lower consumer demand, incentivize industry to reformulate or replace them, and ultimately reduce the burden of diseases driven by high sugar consumption. This fact sheet presents information on:

- **Connections between sugary drinks and risks for non-communicable diseases (NCDs);**
- **Worldwide prevalence of nutrition-related NCDs;**
- **Connections between sugary drinks and environmental harms;**
- **Real-world evidence that taxing sugary drinks is an effective public health policy; and**
- **A summary of best practices for taxing sugary drinks, based on evidence to date.**

## Sugary drinks contribute to obesity and NCDs

- The World Health Organization recommends limiting free sugar intake to less than 10% of total calories and ideally less than 5% — roughly 25 grams (6 teaspoons) per day for adults.<sup>2</sup> Free sugars are any sugars added to a food or drink, as well as sugar from honey, syrups, and fruit juices.
- Sugary drinks are one of the top sources of added and free sugars in the global diet.<sup>3-7</sup>
  - › In countries without sugary drink taxes, a typical 500 mL (16.9 oz) regular soft drink contains 53 grams (13 teaspoons) of free sugar. For an adult consuming 2,000 calories per day, drinking just one of these will contribute 12% of total calories from free sugar, exceeding recommendations.
  - › For most children and adolescents, drinking a single 355 mL (12 oz) can of regular soft drink will put them over the recommended 10% of daily calories from free sugars.
- Sugary drinks often offer little or no nutritional value and pose unique risks due to their liquid form:
  - › The liquid sugars used to sweeten beverages are absorbed more quickly by the liver and processed in a way that increases fat and glycogen deposits,<sup>8-12</sup> which can lead to fatty liver disease and increase risks for type 2 diabetes and other NCDs.<sup>10,13</sup>
  - › Sweeteners consumed in liquid form do not lead to feelings of fullness equal to their calorie content, making it less likely that people will reduce food intake to compensate for calories consumed from sugary drinks.<sup>14-16</sup> This imbalance can lead to greater total calorie intake than what the body needs.
- Sugary drinks also contribute to undernutrition when consumed in place of foods containing essential nutrients.
  - › For example, in some countries, infants may be fed sugary drinks as a weaning food, which can worsen undernutrition and stunting.<sup>17-23</sup> Infants with stunting face much greater risks later in life for high visceral fatness, hypertension, and type 2 diabetes.<sup>20,24-28</sup>
- Regular consumption of sugary drinks is associated with increased risks for a myriad of health problems throughout life, including: obesity,<sup>29-36</sup> type 2 diabetes,<sup>29,36,37</sup> hypertension,<sup>29,38,39</sup> heart disease and its risk factors,<sup>8,36-38,40-42</sup> tooth decay and poor oral health,<sup>43,44</sup> certain cancers,<sup>45-48</sup> liver disease,<sup>49-52</sup> frailty in older age,<sup>53</sup> declining cognitive function and dementia,<sup>54-56</sup> and premature death.<sup>37,47,48,57-61</sup>
- Meta-analyses in 2020<sup>29</sup> and 2021<sup>57</sup> estimated that for every 250 mL increase in daily sugary drink intake:



High-sugar drinks can include carbonated soft drinks, energy and sports drinks, sweetened coffees and teas, fruit drinks, 100% fruit juices, and dairy and non-dairy milks with added sugars.

- Among children and adolescents:
  - › Drinking sugar-sweetened beverages four or more times per week is associated with 24% greater odds of childhood overweight or obesity.<sup>30</sup>
  - › High sugary drink consumption is associated with a 0.75 kg/m<sup>2</sup> increase in BMI, 2.35 cm greater waist circumference, and 2.74% higher body fat percentage compared to low consumption.<sup>35</sup>
  - › Pediatric hypertension is 36% more likely to develop among children and adolescents drinking high vs. low amounts of sugary drinks.<sup>39</sup>
  - › These risks are especially concerning given that excess weight during childhood is likely to persist into adulthood,<sup>62-66</sup> increases risks of developing type 2 diabetes, heart disease, and cancer at a younger age, and can shorten life expectancy.<sup>64,65,67-73</sup>
  - › Excess weight during childhood and adolescence can also take a psychological and social toll due to weight stigma, increasing risks for depression, anxiety, low self-esteem, peer bullying, eating disorders, or poor performance in school.<sup>65,74-82</sup>
- In many places, groups who experience higher rates of nutrition-related NCDs and worse health outcomes from them also tend to consume more sugary drinks, due to factors such as lower cost and easier access relative to healthier options as well as highly targeted marketing by beverage companies.<sup>83-93</sup>
  - › Sugary drinks are one of the most heavily marketed products in the world. The beverage industry targets vulnerable populations — including children, certain racial and ethnic groups, and developing countries — with heavy promotional and marketing efforts.<sup>94-96</sup>
- NCDs carry tremendous personal costs in terms of quality and length of life and burdens of disease treatment and management, as well as public costs for health care systems, workforces, and economies.



## Global prevalence of obesity and other nutrition-related diseases

- **NCDs** — including nutrition-related diseases such as obesity, type 2 diabetes, hypertension, heart disease, stroke, and some cancers — cause 7 out of 10 deaths worldwide and in low- and middle-income countries, over 8 out of 10 premature deaths from ages 30–69.<sup>97</sup>
- In addition to causing **premature death**, NCDs take away years of healthy life: In 2019, NCDs cost the world 1.6 billion disability-adjusted life years (DALYs, or years of life lost due to premature death + years of disease-free life lost).<sup>98</sup> This is a roughly 20 percentage point increase since 1990.
- Diets high in sugar-sweetened beverages, specifically, were responsible for over 6 million lost years of healthy life in 2019.<sup>99</sup>
- Worldwide prevalence of **obesity** has tripled since 1975 and continues to climb, especially in low-and middle-income countries.<sup>100-105</sup>
- Over 2.2 billion people (more than one-third of the world’s population) are now classified as **overweight** or **obese**.<sup>101,102,106</sup> Trends among children are especially concerning:
  - › Worldwide, an estimated 340 million children ages 5–19 years are now classified as overweight or obese — a tenfold increase over the past four decades.<sup>107,108</sup> Among preschoolers, prevalence has risen 60% since 1990, with 43 million preschoolers now classified as overweight or obese and a further 92 million at risk.<sup>109</sup>
  - › Low- and middle-income countries are now seeing the most rapid rise:<sup>107,110</sup> For example, estimated childhood overweight and obesity prevalence now meets or exceeds 30% in Argentina, Colombia, and Malaysia and exceeds 20% in Bolivia, China, Ethiopia, Indonesia, Jamaica, Kenya, Libya, Nigeria, and Vietnam.<sup>1</sup>
  - › Even at a young age, obesity can have negative effects on nearly every organ system and disrupt hormones that control blood sugar and normal development.<sup>65,67,72,73,110-112</sup>
  - › Excess weight during childhood is likely to persist into adulthood,<sup>62-66</sup> increases risks of developing type 2 diabetes, heart disease, and cancer at a younger age, and can shorten life expectancy.<sup>64,65,67-73</sup>
- **Type 2 diabetes** is also one of the fastest-growing global health threats, with an estimated 537 million adults living with diabetes today and 246 million more projected by 2045; 3 in 4 of these adults live in low- and middle-income countries.<sup>113</sup>
- An estimated 1.28 billion adults worldwide have **hypertension**. Of these, nearly half don’t know they have the condition, and only 1 in 5 has their high blood pressure treated and under control.<sup>114</sup>
  - › Two-thirds of adults with hypertension live in low- and middle-income countries.<sup>114</sup>
- Obesity and other NCDs are associated with significantly increased health care costs, lost wages due to illnesses and disability, reduced productivity, and earlier retirement.<sup>115-117</sup>

## Environmental costs

Sugary drinks also have serious environmental costs:

Both the production and disposal of plastic drink bottles generate an enormous carbon footprint: Most are made from plastic derived from fossil fuels, and the billions of bottles that are not recycled every year wind up incinerated, in landfills, or littering natural environments.<sup>118</sup>

An estimated 21–34 billion plastic drink bottles ended up in the world's oceans in 2018, alone — the equivalent of up to 1.1 million metric tons of plastic bottle waste.<sup>119</sup>

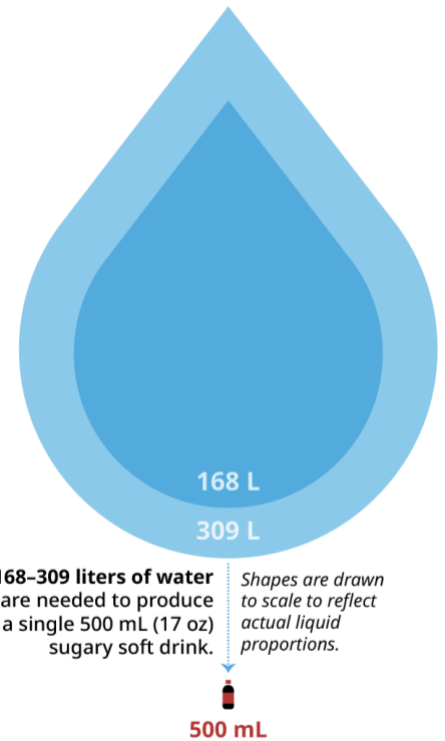
In 2020, three of the world's largest drink companies generated a combined 121 million tons of heat-trapping greenhouse gases, exceeding the output of many entire countries.<sup>118,120</sup>

An estimated 168–309 liters of water are used to produce a single 500 mL (16.9 oz) regular sugary drink (varies depending on sugar source and inclusion of ingredients such as caffeine or vanilla extract).<sup>121-123</sup>

Beverage companies' exploitation of water resources is of increasing global concern, for example, the practice of taking from water-scarce countries for use in production of exported beverages.<sup>124-126</sup>

Curbing global sugar consumption could free up sugarcane feedstock or farmland for use in biofuel production and prevent destructive clearing of native, carbon-dense ecosystems to meet increasing demands for alternative energy sources.<sup>127</sup>

- For example, 30–54 metric tons of greenhouse gas emissions could be eliminated yearly if the European Union reduces sugar consumption to align with health recommendations and excess sugarcane is redirected to ethanol production.<sup>128</sup>



## Sugary drink intake is high or increasing, globally

While sugary drink consumption has plateaued or even declined slightly in many high-income countries, it remains at levels high enough to continue driving increased risks for many NCDs.<sup>129-132</sup>

In low- and middle-income countries, sugary drink consumption continues climbing as companies have invested heavily in expanding global production, distribution, and promotion of their products to developing markets.<sup>129-132</sup>

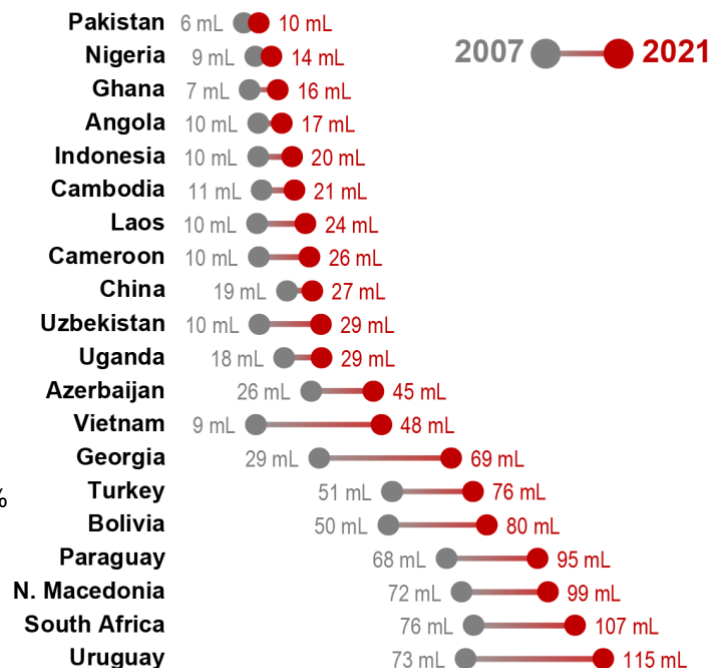
Total volume of sugary drinks sold in middle-income countries now exceeds that of high-income countries.<sup>132</sup>

The Caribbean has the highest sugary drink intake of any world region: Caribbeans drink nearly 2 servings per day on average; Central Latin American countries follow at 1.6 daily servings per person.<sup>129</sup>

The cost of sugary drinks has fallen more than for healthier alternatives over time.

- In 79 out of 82 countries studied, the cost of sugar-sweetened drinks as a share of income fell from 1990–2016, decreasing on average 9% annually in low- and middle income countries and 2% annually in high-income countries.<sup>85</sup>
- In many countries, sugary drinks cost less than bottled water.<sup>85</sup>
- As sugary drinks become cheaper, people consume more, and rates overweight and obesity rise.<sup>86</sup>

### Growth in per capita sales of ready-to-drink soft drinks\* 2007–2021



\* Excluding bottled waters. Source: Euromonitor International Limited 2022 © All rights reserved


## Taxing sugary drinks to reduce harm and improve health

- Sugary drink taxes are triple-win, cost-effective policy option that can improve population health, increase government revenue, and reduce health care and environmental costs.<sup>133-139</sup>
- Sugary drink taxes are projected to save millions of years of life globally by reducing incidence of diseases caused by excess sugar and calorie intake.<sup>140,141</sup>
- Taxes on sugary drinks generate significant revenue that can be used to fund obesity prevention efforts and other health initiatives, further enhancing their overall positive impact.<sup>138,139,142,143</sup>
- Taxes based on sugar content rather than beverage volume (wherein higher-sugar drinks face higher taxation) can incentivize manufacturers to cut the amount of sugar in their product offerings, increasing likelihood of greater population health gains.<sup>133,144-147</sup>
- The process of passing and implementing sugary drink taxes can increase public awareness of the health risks associated with sugary drinks and incentivize industry to reformulate and introduce healthier beverage options ahead of tax implementation.<sup>148-153</sup>
- **Sugary drink taxes can improve health equity.** Reducing sugary drink consumption can have especially positive impacts among lower-income populations, who in many places experience obesity and other NCDs at higher rates, at greater personal cost, and with worse outcomes than higher-income groups.<sup>154-162</sup> Sugary drink taxes — especially alongside other public health policies such as [front-of-package warning labels](#) and [restrictions on marketing](#) — could help alleviate this disproportionate health burden. Using revenue from sugary drink taxes to enhance access to healthy food, health care, or other public services can offset any added costs that lower-income groups may incur from paying a greater percentage of income to continue purchasing sugary drinks.<sup>163,164</sup>
  - › For example, across the U.S. cities of Philadelphia, Seattle, and San Francisco, while lower-income populations paid a higher percentage of income on beverage taxes, the cities' allocation of tax revenue to fund programs targeting lower-income populations yielded a significant net transfer of funds towards lower-income communities.<sup>163</sup> Examples of equitable uses for tax revenue include:
    - › In the United States, the Philadelphia Beverage Tax has generated \$385 million in total revenue to date, the majority of which has gone towards funding the city's universal pre-kindergarten program.<sup>165</sup> This program has in turn enabled many parents to join the workforce or increase productivity and created an estimated 800–1,350 new jobs and \$28–60 million in additional labor income.<sup>166</sup>
    - › In Portugal, Poland, and Hungary, the majority of revenue from sugary drink taxes helps fund the countries' public health services, offsetting some costs related to NCD care.<sup>167-169</sup>
    - › In Malaysia, revenue from a sugar-sweetened beverage excise duty funds free, healthy breakfasts for children in primary schools.<sup>170</sup>

## Taxes work: The global experience

To date, 47 countries and 16 smaller jurisdictions have implemented taxes on sugary drinks with an aim toward improving population health.<sup>171</sup> Fifty-five of these taxes were passed in the last 10 years, demonstrating increased global concern about the harms associated with sugary drink consumption and the need for cost-effective policies to curb high sugar consumption and reduce NCDs.

These taxes are working, according to multiple large reviews of real-world evidence.<sup>133,172,173</sup> The latest review in 2022 found that based on evaluations to date, sugary drink taxes have been associated with significantly increased prices on targeted beverages (i.e., 82% of the tax cost was passed on to consumers) and 15% lower sales of sugary drinks, with no negative impact on employment.<sup>133</sup> Examples of outcomes in specific countries include:

-  **Mexico:** With one of the world's highest sugary drink intakes, Mexico was the first large country to implement a sugary drink tax aimed specifically at improving nutrition and reducing NCDs. Introducing a modest tax of **1 peso per liter** on sugary drinks in 2014 (roughly a 10% volumetric tax) led to reduced purchases of taxed drinks and increased bottled water purchases, with no change in total employment.<sup>174-180</sup>
  - › From 2012 to 2016, purchases of taxed beverages dropped by an estimated 37% in Mexico.<sup>179</sup>
  - › Reduced sugary drink consumption following Mexico's tax was greatest among lower-income and high-volume consumers, the two groups facing the greatest health risk.<sup>177,181</sup>
  - › Mexican consumers replaced some sugary drinks with healthier beverages: Water purchases increased an estimated 5% in the first year,<sup>180</sup> while all untaxed beverage purchases (i.e., drinks with lower sugar content)



*Learn more about different sugary drink taxes around the world* [↗](#)



increased 11%.<sup>179</sup> This trend appears to have plateaued, following an initial jump, but has remained higher than pre-tax levels.<sup>177,179</sup>

- › Three years after Mexico implemented the sugary drink tax, the proportion of health care workers who were medium or high soft drink consumers dropped from over 50% before the tax to 43%, while non-consumers of soft drinks increased from 10% to 14%.<sup>182</sup>
- › Adolescent girls in Mexico had a 3% relative decrease in overweight or obesity prevalence in the first two years of the tax, with greater improvements found in cities where prices increased more than 10%.<sup>183</sup>
- › Based on the first-year reduction in sugary drink consumption in Mexico, it is estimated that 10 years after implementation, Mexico's sugary drink tax will result in an average 2.5% reduction in obesity prevalence (with the largest reductions for lowest-income groups) and prevention of up to 134,000 cases of type 2 diabetes.<sup>184</sup>
- › Implementation of Mexico's sugary drink tax was associated with significant declines in the number of outpatient visits for dental caries (–2,921 visits per month, on average); the probability of experiencing decayed, missing, or filled teeth; and the number of teeth with caries.<sup>185</sup>
- › Employment in food and beverage stores and in the beverage manufacturing sector did not decrease after Mexico's sugary drink tax was implemented.<sup>176</sup>



**United Kingdom:** Announced in 2016 and implemented in 2018, the UK Soft Drinks Industry Levy (SDIL) is a tiered tax based on sugar content. Drinks containing >8 g total sugar per 100 mL are taxed at a rate of **£0.24 per L**, while drinks with 5–8 g total sugar per 100 mL are taxed at **£0.18 per L**.<sup>186</sup> Drinks containing less than 5 g total sugar per 100 mL are not subject to the levy. Tiered tax designs such as this are more likely to encourage industry to reformulate their products, reducing sugar content to avoid higher tax rates.<sup>133</sup> Announcement and implementation of the SDIL resulted in widespread beverage reformulation that significantly reduced sugar in the UK beverage supply.

- › In the two years between announcement and implementation of the levy, manufacturers preemptively removed 45 million kg of sugar from their products.<sup>187</sup>
- › In the levy's first year, shifts in UK consumers' beverage choices led to a 10% drop in the amount of sugar purchased from all soft drinks (taxed and untaxed) — roughly 30 g less sugar per household per week.<sup>188</sup> This was achieved with no change in the total amount of soft drinks purchased and without shoppers spending more on confectionery or alcoholic beverages.
- › By 2019, manufacturers reduced sugar content by 44% in taxable beverages,<sup>189</sup> and the proportion of drinks subject to the levy (i.e., those containing >5 g sugar per 100 mL) fell an estimated 34%.<sup>151</sup>
- › While overall sales of taxed sugary drinks increased 15% from 2015–2019, the amount of sugar purchased from taxed beverages dropped 35%, due to the drinks containing less sugar.<sup>189</sup> These decreases in purchased sugar were much larger than what was observed among food categories targeted as part of a voluntary sugar reduction program.



**South Africa:** In April 2018, South Africa became the first African nation to implement a tax on sugar-sweetened beverages. The country's Health Promotion Levy (HPL) taxes drinks according to their sugar content, at a rate of **0.021 South Rand (ZAR) per gram of sugar above 4 grams**.<sup>190</sup> Roughly the equivalent of a 10% tax, the HPL was enacted at half the originally intended 0.028 ZAR rate (roughly 20% tax) following intense pressure from sugar and beverage industries.<sup>191</sup> Despite this, positive changes from both consumers and industry have been observed following implementation:

- › Purchases of taxable beverages dropped an estimated 29% from 2014 (pre-announcement of the HPL) to post-implementation (2019).<sup>192</sup> Sugar from taxable beverage purchases declined by 51%, with greater declines among lower-income households.
- › Dietary trends in the first year of the HPL mirrored changes in purchases:
  - Young adults (ages 18–39 years) surveyed in Langa, South Africa reduced their daily intake of taxed beverages by 37%.<sup>193</sup> This led to a 31% drop in sugar intake from taxed beverages, or 9 grams sugar per person per day.
  - Black adolescents and adults in Soweto, Johannesburg decreased their frequency of drink sugary beverages by 7 times per week among high-intake consumers and 2 times per week among medium-intake consumers.<sup>194</sup> This change persisted over the following year.
- › Declines in how much sugar South Africans purchased and consumed from beverages resulted from a combination of changes in consumer behaviors and industry reactions to the HPL (i.e., reformulating products to contain less sugar or adding/removing products).<sup>192,193,195</sup>

- From before announcement of the HPL to one year after it was implemented, sugar purchased from all beverages dropped by an estimated 5 grams per capita per day. Overall, 71% of this drop was due to consumers choosing different beverages or reducing the volume of sugary drinks purchased.<sup>195</sup>
- Among households with lower socioeconomic status, consumer-led changes drove 80% of the drop in sugar purchased from beverages. This drop was also greater among these households at –6.4 grams per capita per day.<sup>195</sup>
- › In its first two fiscal years, the HPL generated 5.8 billion ZAR in revenue, which has gone towards the country's general fund.<sup>191,196</sup>
- › At the originally proposed 20% tax rate, it was predicted that South Africa's obesity prevalence could be lowered by an estimated 3.8% in men and 2.4% in women, resulting in 220,000 fewer South African adults with obesity.<sup>197</sup> A 20% tax could offer significant additional healthcare cost savings for the government and for South African families by preventing an estimated 72,000 premature death and saving over R5 billion in healthcare costs over 20 years.<sup>198</sup> over 20 years.<sup>198</sup>



**Philadelphia, Pennsylvania, USA:** In 2017, the city of Philadelphia implemented a **1.5¢ per ounce** excise tax on sweetened drinks — including those containing non-caloric sweeteners.<sup>199</sup> Philadelphia is one of seven U.S. cities with a sugary drink tax, but the first to tax “diet” or “zero-calorie” sweetened beverages at the same rate as sugar-sweetened drinks. Evaluations find that even with some expected cross-border shopping in neighboring towns, the tax has contributed to significant reductions in purchases and consumption of sweetened drinks in Philadelphia, while also raising substantial revenue, which has been invested primarily in free early childhood education.

- › Philadelphia's 1.5¢-per-ounce tax on sweetened drinks was associated with a drop in taxed beverage purchases of up to 38%,<sup>200,201</sup> with a net positive impact on the city's employment and economy.<sup>166,202,203</sup>
- › Two years after Philadelphia's tax began, high school students reported drinking 0.81 less weekly servings of soda compared to students in 7 comparison cities without taxes.<sup>204</sup> The drop was greater among Hispanic and Latinx adolescents (1.13 fewer servings per week) and students with obesity (1.2 fewer servings per week).
- › There is no evidence to date of shoppers in Philadelphia buying more snack foods or alcoholic drinks to replace taxed beverages.<sup>205</sup> Some substitution to untaxed drink concentrates has been observed, but these make up a small portion of overall beverage purchases (12% of dollar sales before the tax vs. 15% after).<sup>205</sup>
- › Philadelphia's tax has generated \$385 million in total revenue since it began.<sup>165</sup> In 2020–2022, roughly half of this went towards funding a universal pre-kindergarten program for Philadelphia children.
- › Provision of free, quality childcare using revenue raised by the Philadelphia Beverage Tax has created an estimated 800–1,350 new jobs and \$28–60 million in additional labor income, as parents were able to join the labor market or increase productivity.<sup>166</sup> These gains primarily impacted low-income families.



**Gulf Cooperation Council (GCC):** The GCC countries of Saudi Arabia, Bahrain, Qatar, United Arab Emirates, and Oman have levied the largest sugary drink taxes to date: a 50% excise tax on carbonated soft drinks and 100% excise tax on energy drinks since 2017–2019 (implementation years vary by country).<sup>206,207</sup> The 50% tax rate has been expanded in several GCC countries in recent years to apply more broadly to sugar-sweetened drinks. These taxes are unique beyond their large rates in that they are levied in countries where sales of alcoholic beverages is largely prohibited and there is limited opportunity to shop tax-free across borders, as the entire region adopted similar taxes. While few evaluations have been published to date, one study from Saudi Arabia — the first of the GCC countries to implement the taxes in 2017 — found that sales volume of taxed carbonated beverages dropped 33% relative to untaxed beverage sales by 2018 (prior to tax expansion to sweetened soft drinks).<sup>208</sup>

## Lessons for future policies

Jurisdictions considering adopting or strengthening a sugary drink tax now have the benefit of learning from real-world successes, both in strategies to build support for a policy and effective tax designs to reduce sugary drink purchases. While the best approach will vary depending on local contextual factors, resources, and goals, evidence from real-world policies, scientific modeling studies, and economic and behavioral foundational research, provides some key guidelines:

- **Choose a tax base that includes all drinks high in free sugar.** For meaningful health improvements and to avoid substitution to other high-sugar options, a tax should ideally target all sugary beverages, including drinks sweetened with added sugars as well as sugars naturally present in honey, syrups, nectars, and fruit juices. Taxes should apply to all sugary beverage types commonly consumed, including liquid or powder concentrates, and ideally sugar-sweetened dairy-based drinks and 100% fruit juices, as these all contribute to free sugar intake.

- **Higher taxes will have more meaningful impacts.**
  - › To date, most taxes have raised prices on sugary drinks by a relatively small amount ( $\leq 10\%$ ).<sup>133</sup> Changes in calorie and sugar consumption from beverages have been significant, but small, and health benefits from could be enhanced and accelerated under larger taxes, ideally at a rate equivalent to 20% or greater.<sup>147,209-213</sup>
  - › Complete “pass-through” of taxes (raising sales prices of sugary drinks to match the full tax rate) will also enhance tax effectiveness. On average, taxes are currently passed through at a rate of 82%.<sup>133</sup>
  - › Excise taxes tend to be passed through to consumers more closely to their intended rate than other tax types (e.g., ad valorem taxes), but will need to be adjusted annually for inflation and changes in income.<sup>209</sup>
- **Specific excise taxes based on sugar content are most effective at lowering sugar consumption.** Specific excise taxes are the most commonly used sugary drink tax approach globally and can be based on beverage volume or sugar content. Evidence to date indicates:
  - › Taxes based on the amount of sugar in a beverage can yield greater reductions in sugar consumption, in part by incentivizing industry to reformulate or introduce new products that are lower in sugar.<sup>145-147,209</sup>
  - › Volume-based taxes (wherein specified sugary drinks are taxed at a rate per unit of volume, regardless of differences in sugar content) can generate more revenue relative to sugar density taxes but will have a lesser effect on product reformulation and reducing sugar consumption.<sup>145-147,209</sup>
- **Plan for strategic use of generated revenue.** Earmarking or directing revenue to fund programs or services that improve public welfare can increase support for its adoption, increase health equity, and enhance the net positive impacts of the tax.<sup>147,163,169,214</sup>
- **Combining taxes on sugary drinks with subsidies or price incentives to lower the cost of healthier foods and drinks can have a greater health impact than a sugary drink tax, alone.**<sup>215-220</sup>
  - › Combining a tax on sugary drinks (or other ultra-processed foods) with a targeted subsidy for fruits and vegetables can also offset any short-term financial burdens incurred by low-income consumers.<sup>215,218,219</sup>
  - › Other fiscal policies such as cash transfer programs and changes to agricultural subsidies or trade policies can further improve which foods and drinks are affordable and accessible.<sup>221</sup>
- **Sugary drink taxes should ideally be implemented as part of a broader policy strategy** that includes mutually reinforcing policies such as [restrictions on marketing](#) and mandatory [front-of-package warning labels](#) on [ultra-processed products](#) high in sugar, salt, saturated fat, and other harmful ingredients.
  - › Two years after increasing a tax on sugary drinks, Chile implemented broad marketing restrictions, front-of-package warning labels, and a ban on marketing and sales in schools for foods and drinks that do not meet nutritional criteria. Changes in consumer behavior observed after this set of policies took effect are larger than those achieved in many countries with standalone sugary drink taxes.<sup>222</sup>
- **Prepare for industry resistance.** Policymakers and health advocates will meet significant push-back from beverage industry actors.<sup>96,169,214,223,224</sup> For more information on common industry arguments and evidence-based responses to their claims, see: [Sugar-Sweetened Beverage Taxation – Industry Arguments](#). [↗](#)
- **Designing and passing a sugary drink tax requires the coordinated, sustained effort and expertise of a broad coalition.** Ultimately, a tax policy’s success will depend on the cooperation of government ministries (e.g., health, finance, and treasury), economists, public health experts, academics, medical organizations, public figures, and consumer advocates. This engagement should begin early in the tax development process to build consensus and strengthen support across sectors.<sup>169,214,223</sup>

It is now well-established that sugary drink taxes work as a public health policy intervention. A considerable body of evidence including several large reviews from existing sugary drink taxes around the world confirm that targeted taxes reduce prices, purchases, and intake of sugary drinks,<sup>133,172,173</sup> which can ultimately reduce risk for obesity and other NCDs and improve overall population and personal health. Evidence from countries using tax revenue to fund public programs or health initiatives also underscores the potential for taxes to benefit public welfare and improve equity beyond sugar reduction and its health impacts. These findings echo the success of tobacco taxes, which have played a major role in reducing tobacco use worldwide.<sup>225</sup> Like tobacco, the negative health, environmental, and economic impacts of sugary drink consumption harm everyone, whether directly or indirectly. The World Health Organization, World Bank, International Monetary Fund, and UNICEF all support the use of fiscal policy to reduce consumption of sugary drinks.<sup>134,209,226,227</sup> Sugary drink taxes are one key policy in an range of regulatory interventions needed to slow or turn the tide on the nutrition transition in low- and middle-income countries and alleviate the NCD burden worldwide.<sup>221</sup>

## REFERENCES

- World Obesity Federation. Global Obesity Observatory. <https://data.worldobesity.org>. Published 2022. Accessed Oct 29, 2022.
- World Health Organization. Guideline: Sugar intake for adults and children. WHO. <https://www.who.int/publications/i/item/9789241549028>. Published 2015. Accessed Oct 30, 2022.
- Maunder EM, Nel JH, Steyn NP, Kruger HS, Labadarios D. Added sugar, macro- and micronutrient intakes and anthropometry of children in a developing world context. *PLOS One*. 2015;10(11):e0142059.
- Lei L, Rangan A, Flood VM, Louie JCY. Dietary intake and food sources of added sugar in the Australian population. *Brit J Nutr*. 2016;115(5):868-877.
- Ruiz E, Rodriguez P, Valero T, et al. Dietary Intake of Individual (Free and Intrinsic) Sugars and Food Sources in the Spanish Population: Findings from the ANIBES Study. *Nutrients*. 2017;9(3):275.
- Bailey RL, Fulgoni VL, Cowan AE, Gaine PC. Sources of Added Sugars in Young Children, Adolescents, and Adults with Low and High Intakes of Added Sugars. *Nutrients*. 2018;10(1):102.
- Graffe MIM, Pala V, De Henauw S, et al. Dietary sources of free sugars in the diet of European children: the IDEFICS Study. *Eur J Nutr*. 2020;59(3):979-989.
- Malik VS, Hu FB. Fructose and Cardiometabolic Health: What the Evidence From Sugar-Sweetened Beverages Tells Us. *J Am Coll Cardiol*. 2015;66(14):1615-1624.
- Sundborn G, Thornley S, Merriman TR, et al. Are Liquid Sugars Different from Solid Sugar in Their Ability to Cause Metabolic Syndrome? *Obesity*. 2019;27(6):879-887.
- Stanhope KL, Goran MI, Bosity-Westphal A, et al. Pathways and mechanisms linking dietary components to cardiometabolic disease: thinking beyond calories. *Obes Rev*. 2018;0(0).
- Stanhope KL. Role of fructose-containing sugars in the epidemics of obesity and metabolic syndrome. *Annu Rev Med*. 2012;63:329-343.
- Stanhope KL, Bremer AA, Medici V, et al. Consumption of Fructose and High Fructose Corn Syrup Increase Postprandial Triglycerides, LDL-Cholesterol, and Apolipoprotein-B in Young Men and Women. *J Clin Endocr Metab*. 2011;96(10):E1596-E1605.
- Jensen T, Abdelmalek MF, Sullivan S, et al. Fructose and sugar: A major mediator of non-alcoholic fatty liver disease. *J Hepatol*. 2018;68(5):1063-1075.
- Mourao D, Bressan J, Campbell W, Mattes R. Effects of food form on appetite and energy intake in lean and obese young adults. *Int J Obes*. 2007;31(11):1688-1695.
- DiMeglio DP, Mattes RD. Liquid versus solid carbohydrate: effects on food intake and body weight. *Int J Obes Relat Metab Disord*. 2000;24(6):794-800.
- DellaValle DM, Roe LS, Rolls BJ. Does the consumption of caloric and non-caloric beverages with a meal affect energy intake? *Appetite*. 2005;44(2):187-193.
- Marriott BM, Campbell L, Hirsch E, Wilson D. Preliminary data from demographic and health surveys on infant feeding in 20 developing countries. *J Nutr*. 2007;137(2):518S-523S.
- Zehner E. Promotion and consumption of breastmilk substitutes and infant foods in Cambodia, Nepal, Senegal and Tanzania. *Matern Child Nutr*. 2016;12(S2):3-7.
- Jaacks LM, Kavle J, Perry A, Nyaku A. Programming maternal and child overweight and obesity in the context of undernutrition: current evidence and key considerations for low- and middle-income countries. *Public Health Nutr*. 2017;20(7):1286-1296.
- Audain K, Levy L, Ellahi B. Sugar-sweetened beverage consumption in the early years and implications for type-2 diabetes: a sub-Saharan Africa context. *P Nutr Soc*. 2019:1-7.
- Pries AM, Rehman AM, Filteau S, Sharma N, Upadhyay A, Ferguson EL. Unhealthy Snack Food and Beverage Consumption Is Associated with Lower Dietary Adequacy and Length-for-Age z-Scores among 12–23-Month-Olds in Kathmandu Valley, Nepal. *J Nutr*. 2019.
- Pries AM, Filteau S, Ferguson EL. Snack food and beverage consumption and young child nutrition in low- and middle-income countries: A systematic review. *Matern Child Nutr*. 2019;15(S4):e12729.
- Nordhagen S, Pries AM, Dissieka R. Commercial Snack Food and Beverage Consumption Prevalence among Children 6–59 Months in West Africa. *Nutrients*. 2019;11(11):2715.
- Adair LS, Fall CH, Osmond C, et al. Associations of linear growth and relative weight gain during early life with adult health and human capital in countries of low and middle income: findings from five birth cohort studies. *Lancet*. 2013;382(9891):525-534.
- Stein AD, Wang M, Martorell R, et al. Growth patterns in early childhood and final attained stature: data from five birth cohorts from low- and middle-income countries. *Am J Hum Biol*. 2010;22(3):353-359.
- Martorell R, Horta BL, Adair LS, et al. Weight gain in the first two years of life is an important predictor of schooling outcomes in pooled analyses from five birth cohorts from low- and middle-income countries. *J Nutr*. 2010;140(2):348-354.
- Adair LS, Martorell R, Stein AD, et al. Size at birth, weight gain in infancy and childhood, and adult blood pressure in 5 low- and middle-income-country cohorts: when does weight gain matter? *Am J Clin Nutr*. 2009;89(5):1383-1392.
- Wells JC, Ana Lydia Sawaya, Rasmus Wibaek, Martha Mwangome, Marios S Poullas, Ranjan Yajnik, Alessandro Demaio. The double burden of malnutrition: etiological pathways and consequences for health. *Lancet*. 2019(dec publication),.
- Qin P, Li Q, Zhao Y, et al. Sugar and artificially sweetened beverages and risk of obesity, type 2 diabetes mellitus, hypertension, and all-cause mortality: a dose-response meta-analysis of prospective cohort studies. *Eur J Epidemiol*. 2020;35(7):655-671.
- Poorolajal J, Sahraei F, Mohamdadi Y, Doosti-Irani A, Moradi L. Behavioral factors influencing childhood obesity: a systematic review and meta-analysis. *Obes Res Clin Pract*. 2020;14(2):109-118.
- Te Morenga L, Mallard S, Mann J. Dietary sugars and body weight: systematic review and meta-analyses of randomised controlled trials and cohort studies. *British Medical Journal*. 2013;346:e7492
- Malik VS, Willett WC, Hu FB. Global obesity: trends, risk factors and policy implications. *Nat Rev Endocrinol*. 2013;9(1):13-27.
- Malik VS, Pan A, Willett WC, Hu FB. Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. *Am J Clin Nutr*. 2013;98(4):1084-1102.
- de Ruyter JC, Olthof MR, Seidell JC, Katan MB. A Trial of Sugar-free or Sugar-Sweetened Beverages and Body Weight in Children. *New Engl J Med*. 2012;367(15):1397-1406.
- Abbasalizad Farhangi M, Mohammadi Tofigh A, Jahangiri L, Nikniaz Z, Nikniaz L. Sugar-sweetened beverages intake and the risk of obesity in children: An updated systematic review and dose-response meta-analysis. *Pediatr Obes*. 2022:e12914.
- Neelakantan N, Park SH, Chen G-C, van Dam RM. Sugar-sweetened beverage consumption, weight gain, and risk of type 2 diabetes and cardiovascular diseases in Asia: a systematic review. *Nutr Rev*. 2021;80(1):50-67.
- Meng Y, Li S, Khan J, et al. Sugar- and Artificially Sweetened Beverages Consumption Linked to Type 2 Diabetes, Cardiovascular Diseases, and All-Cause Mortality: A Systematic Review and Dose-Response Meta-Analysis of Prospective Cohort Studies. *Nutrients*. 2021;13(8):2636.
- Te Morenga LA, Howatson AJ, Jones RM, Mann J. Dietary sugars and cardiometabolic risk: systematic review and meta-analyses of randomized controlled trials of the effects on blood pressure and lipids. *Am J Clin Nutr*. 2014;100(1):65-79.
- Farhangi MA, Nikniaz L, Khodarahmi M. Sugar-sweetened beverages increases the risk of hypertension among children and adolescence: a systematic review and dose-response meta-analysis. *J Transl Med*. 2020;18(1):344.
- Malik VS, Hu FB. Sugar-Sweetened Beverages and Cardiometabolic Health: An Update of the Evidence. *Nutrients*. 2019;11(8):1840.
- de Koning L, Malik VS, Kellogg MD, Rimm EB, Willett WC, Hu FB. Sweetened Beverage Consumption, Incident Coronary Heart Disease and Biomarkers of Risk in Men. *Circulation*. 2012;125:1735-1741.
- Nikniaz L, Abbasalizad-Farhangi M, Vajdi M, Nikniaz Z. The association between Sugars Sweetened Beverages (SSBs) and lipid profile among children and youth: A systematic review and dose-response meta-analysis of cross-sectional studies. *Pediatr Obes*. 2021;16(7):e12782.
- Valenzuela MJ, Waterhouse B, Aggarwal VR, Bloor K, Doran T. Effect of sugar-sweetened beverages on oral health: a systematic



- review and meta-analysis. *Eur J Public Health*. 2020;31(1):122-129.
44. Moss ME, Luo H, Rosinger AY, Jacobs MM, Kaur R. High sugar intake from sugar-sweetened beverages is associated with prevalence of untreated decay in US adults: NHANES 2013–2016. *Community Dent Oral.n/a(n/a)*.
  45. Arroyo-Quiroz C, Brunauer R, Alavez S. Sugar-Sweetened Beverages and Cancer Risk: A Narrative Review. *Nutr Cancer*. 2022;1-19.
  46. Joh H-K, Lee DH, Hur J, et al. Simple Sugar and Sugar-Sweetened Beverage Intake During Adolescence and Risk of Colorectal Cancer Precursors. *Gastroenterology*. 2021;161(1):128-142.e120.
  47. Li Y, Guo L-I, He K, Huang C, Tang S. Consumption of sugar-sweetened beverages and fruit juice and human cancer: a systematic review and dose-response meta-analysis of observational studies. *J Cancer*. 2021;12(10):3077.
  48. Chen CH, Tsai MK, Lee JH, et al. "Sugar-Sweetened Beverages" Is an Independent Risk From Pancreatic Cancer: Based on Half a Million Asian Cohort Followed for 25 Years. *Front Oncology*. 2022;12.
  49. Chen H, Wang J, Li Z, et al. Consumption of Sugar-Sweetened Beverages Has a Dose-Dependent Effect on the Risk of Non-Alcoholic Fatty Liver Disease: An Updated Systematic Review and Dose-Response Meta-Analysis. *Int J Env Res Pub He*. 2019;16(12):2192.
  50. Asgari-Taee F, Zerafati-Shoae N, Dehghani M, Sadeghi M, Baradaran HR, Jazayeri S. Association of sugar sweetened beverages consumption with non-alcoholic fatty liver disease: a systematic review and meta-analysis. *Eur J Nutr*. 2019;58(5):1759-1769.
  51. Park WY, Yiannakou I, Petersen JM, Hoffmann U, Ma J, Long MT. Sugar-Sweetened Beverage, Diet Soda, and Nonalcoholic Fatty Liver Disease Over 6 Years: The Framingham Heart Study. *Clin Gastroenterol H*. 2021.
  52. Leung CW, Tapper EB. Sugar-sweetened Beverages Are Associated With Increased Liver Stiffness and Steatosis Among Apparently Healthy Adults in the United States. *Clin Gastroenterol H*. 2022;20(4):959-961.e951.
  53. Struijk EA, Rodríguez-Artalejo F, Fung TT, Willett WC, Hu FB, Lopez-García E. Sweetened beverages and risk of frailty among older women in the Nurses' Health Study: a cohort study. *PLOS Med*. 2020;17(12):e1003453.
  54. Muñoz-García MI, Martínez-González MA, Martín-Moreno JM, et al. Sugar-sweetened and artificially-sweetened beverages and changes in cognitive function in the SUN project. *Nutr Neurosci*. 2020;23(12):946-954.
  55. Miao H, Chen K, Yan X, Chen F. Sugar in Beverage and the Risk of Incident Dementia, Alzheimer's disease and Stroke: A Prospective Cohort Study. *J Prev Alzheimers Dis*. 2021;8(2):188-193.
  56. Liu H, Liu Y, Shi M, Zhou Y, Zhao Y, Xia Y. Meta-analysis of sugar-sweetened beverage intake and the risk of cognitive disorders. *J Affect Disorders*. 2022;313:177-185.
  57. Li H, Liang H, Yang H, et al. Association between intake of sweetened beverages with all-cause and cause-specific mortality: a systematic review and meta-analysis. *J Public Health*. 2021.
  58. Zhang Y-B, Chen J-X, Jiang Y-W, Xia P-F, Pan A. Association of sugar-sweetened beverage and artificially sweetened beverage intakes with mortality: an analysis of US National Health and Nutrition Examination Survey. *Eur J Nutr*. 2021;60(4):1945-1955.
  59. Zhang Y-B, Jiang Y-W, Chen J-X, Xia P-F, Pan A. Association of Consumption of Sugar-Sweetened Beverages or Artificially Sweetened Beverages with Mortality: A Systematic Review and Dose-Response Meta-Analysis of Prospective Cohort Studies. *Adv Nutr*. 2020;12(2):374-383.
  60. Farvid MS, Spence ND, Rosner BA, et al. Consumption of sugar-sweetened and artificially sweetened beverages and breast cancer survival. *Cancer*. 2021;127(15):2762-2773.
  61. Huang H-L, Abe SK, Sawada N, et al. Association of sugary drink consumption with all-cause and cause-specific mortality: the Japan Public Health Center-based Prospective Study. *Preventive Medicine*. 2021;148:106561.
  62. Singh AS, Mulder C, Twisk JW, van Mechelen W, Chinapaw MJ. Tracking of childhood overweight into adulthood: a systematic review of the literature. *Obes Rev*. 2008;9(5):474-488.
  63. Geserick M, Vogel M, Gausche R, et al. Acceleration of BMI in early childhood and risk of sustained obesity. *New Engl J Med*. 2018.
  64. Ji Y, Zhao X, Feng Y, et al. Body mass index trajectory from childhood to puberty and high blood pressure: the China Health and Nutrition Survey. *BMJ Open*. 2021;11(11):e0055099.
  65. Pulgarón ER. Childhood obesity: A review of increased risk for physical and psychological comorbidities. *Clin Ther*. 2013;35(1):A18-A32.
  66. Simmonds M, Llewellyn A, Owen CG, Woolacott N. Predicting adult obesity from childhood obesity: a systematic review and meta-analysis. *Obes Rev*. 2016;17(2):95-107.
  67. Harvard School Of Public Health. Child Obesity: Too Many Kids Are Too Heavy, Too Young. Obesity Prevention Source Web site. <https://www.hsph.harvard.edu/obesity-prevention-source/obesity-trends/global-obesity-trends-in-children/#References>. Accessed May 11, 2022.
  68. World Health Organization. Noncommunicable diseases: Childhood overweight and obesity. <http://www.who.int/dietphysicalactivity/childhood/en/>. Published 2020. Accessed May 11, 2022.
  69. Sun SS, Liang R, Huang TTK, et al. Childhood Obesity Predicts Adult Metabolic Syndrome: The Fels Longitudinal Study. *J Pediatr*. 2008;152(2):191-200.e191.
  70. Reilly JJ, Kelly J. Long-term impact of overweight and obesity in childhood and adolescence on morbidity and premature mortality in adulthood: systematic review. *Int J Obesity*. 2011;35(7):891-898.
  71. Olshansky SJ, Passaro DJ, Hershov RC, et al. A potential decline in life expectancy in the United States in the 21st century. *New Engl J Med*. 2005;352(11):1138-1145.
  72. Daniels S. Complications of obesity in children and adolescents. *Int J Obesity*. 2009;33:S60-S65.
  73. Sahoo K, Sahoo B, Choudhury AK, Sofi NY, Kumar R, Bhadoria AS. Childhood obesity: Causes and consequences. *J Fam Med Prim Care*. 2015;4(2):187.
  74. Morrison KM, Shin S, Tarnopolsky M, Taylor VH. Association of depression & health related quality of life with body composition in children and youth with obesity. *J Affect Disorders*. 2015;172:18-23.
  75. Halfon N, Larson K, Slusser W. Associations between obesity and comorbid mental health, developmental, and physical health conditions in a nationally representative sample of US children aged 10 to 17. *Acad Pediatr*. 2013;13(1):6-13.
  76. Schwimmer JB, Burwinkle TM, Varni JW. Health-related quality of life of severely obese children and adolescents. *JAMA*. 2003;289(14):1813-1819.
  77. Taylor VH, Forhan M, Vigod SN, McIntyre RS, Morrison KM. The impact of obesity on quality of life. *Best Pract Res Clin En*. 2013;27(2):139-146.
  78. Neumark-Sztainer D, Story M, Hannan PJ, Perry CL, Irving LM. Weight-related concerns and behaviors among overweight and nonoverweight adolescents: implications for preventing weight-related disorders. *Arch Pediat Adol Med*. 2002;156(2):171-178.
  79. Griffiths LJ, Wolke D, Page AS, Horwood J. Obesity and bullying: different effects for boys and girls. *Arch Dis Child*. 2006;91(2):121-125.
  80. Lumeng JC, Forrest P, Appugliese DP, Kaciroti N, Corwyn RF, Bradley RH. Weight status as a predictor of being bullied in third through sixth grades. *Pediatrics*. 2010;125(6):e1301-e1307.
  81. Pont SJ, Puhl R, Cook SR, Slusser W, OBESITY SO, SOCIETY TO. Stigma Experienced by Children and Adolescents With Obesity. *Pediatrics*. 2017;140(6).
  82. Puhl RM, Lessard LM. Weight Stigma in Youth: Prevalence, Consequences, and Considerations for Clinical Practice. *Current Obesity Reports*. 2020;9(4):402-411.
  83. Mendez MA, Miles DR, Poti JM, Sotres-Alvarez D, Popkin BM. Persistent disparities over time in the distribution of sugar-sweetened beverage intake among children in the United States. *Am J Clin Nutr*. 2018;109(1):79-89.
  84. Bleich SN, Vercammen KA, Koma JW, Li Z. Trends in Beverage Consumption Among Children and Adults, 2003-2014. *Obesity*. 2018;26(2):432-441.
  85. Blecher E, Liber AC, Drope JM, Nguyen B, Stoklosa M. Global trends in the affordability of sugar-sweetened beverages, 1990–2016. *Prev Chronic Dis*. 2017;14.
  86. Ferretti F, Mariani M. Sugar-sweetened beverage affordability and the prevalence of overweight and obesity in a cross section of countries. *Globalization Health*. 2019;15(1):30.
  87. Warren C, Hobin E, Manuel DG, et al. Socioeconomic position and consumption of sugary drinks, sugar-sweetened beverages and 100% juice among Canadians: a cross-sectional analysis of the 2015 Canadian Community Health Survey–Nutrition. *C J Public Health*. 2022;113(3):341-362.

88. Zagorsky JL, Smith PK. Who drinks soda pop? Economic status and adult consumption of sugar-sweetened beverages. *Econ Hum Biol.* 2020;38:100888.
89. Powell LM, Wada R, Kumanyika SK. Racial/ethnic and income disparities in child and adolescent exposure to food and beverage television ads across the U.S. media markets. *Health & Place.* 2014;29:124-131.
90. Rudd Center for Food Policy & Obesity. Increasing disparities in unhealthy food advertising targeted to Hispanic and Black youth. <https://uconnruddcenter.org/wp-content/uploads/sites/2909/2020/09/TargetedMarketingReport2019.pdf>. Published 2019. Accessed Oct 30, 2022.
91. Eisenberg MD, Avery RJ, Mathios A, Ernst P, Cawley J. Disparities in exposure to television advertising of sugar-sweetened and non-nutritive sweetened beverages among U.S. adults and teens, 2007–2013. *Preventive Medicine.* 2021;150:106628.
92. Backholer K, Gupta A, Zorbas C, et al. Differential exposure to, and potential impact of, unhealthy advertising to children by socio-economic and ethnic groups: A systematic review of the evidence. *Obes Rev.* 2021;22(3):e13144.
93. Sinclair B. Sugary drink companies target low & middle-income countries. <https://www.wcrf.org/sugary-drink-companies-target-low-middle-income-countries/>. Published 2016. Accessed Oct 30, 2022.
94. Kelly B, Vandevijvere S, Ng S, et al. Global benchmarking of children's exposure to television advertising of unhealthy foods and beverages across 22 countries. *Obes Rev.* 2019;20(S2):116-128.
95. World Health Organization. Food marketing exposure and power and their associations with food-related attitudes, beliefs and behaviours: A narrative review. <https://www.who.int/publications/i/item/9789240041783>. Published 2022. Accessed Sept 2, 2022.
96. Du M, Tugendhaft A, Erzse A, Hofman KJ. Sugar-Sweetened Beverage Taxes: Industry Response and Tactics. *Yale J Biol Med.* 2018;91(2):185-190.
97. World Health Organization. Noncommunicable diseases. <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>. Published 2021. Accessed Aug 20, 2022.
98. Lancet T. Global Health Metrics: Non-communicable diseases—Level 1 cause. <https://www.thelancet.com/pb-assets/Lancet/gbd/summaries/diseases/non-communicable-diseases.pdf>. Published 2020. Accessed Aug 20, 2022.
99. Lancet T. Global Health Metrics: Diet high in sugar-sweetened beverages—Level 3 risk. <https://www.thelancet.com/pb-assets/Lancet/gbd/summaries/risks/diet-sweetened-beverages.pdf>. Published 2020. Accessed Aug 20, 2022.
100. World health Organization. Obesity and overweight. <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>. Published 2021. Accessed Aug 20, 2022.
101. NCD Risk Factor Collaboration. Trends in adult body-mass index in 200 countries from 1975 to 2014: A pooled analysis of 1698 population-based measurement studies with 19.2 million participants. *Lancet.* 2016;387(10026):1377-1396.
102. Forouzanfar MH, Alexander L, Anderson HR, et al. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet.* 2015;386(10010):2287-2323.
103. Ng M, Fleming T, Robinson M, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet.* 2014.
104. Bauman A, Rutter H, Baur L. Too little, too slowly: international perspectives on childhood obesity. *Pub Health Res Pract.* 2019;29(1).
105. Lobstein T, Brinsden H, World Obesity Federation. Atlas of Childhood Obesity. [http://s3-eu-west-1.amazonaws.com/wof-files/11996\\_Childhood\\_Obesity\\_Atlas\\_Report\\_ART\\_V2.pdf](http://s3-eu-west-1.amazonaws.com/wof-files/11996_Childhood_Obesity_Atlas_Report_ART_V2.pdf). Published 2019. Accessed Nov 5, 2019.
106. The GBD Obesity Collaborators. Health Effects of Overweight and Obesity in 195 Countries over 25 Years. *New Engl J Med.* 2017;377(1):13-27.
107. N. C. D. Risk Factor Collaboration. Worldwide trends in body-mass index, overweight, obesity, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. *Lancet.* 2017;390(10113):2627-2642.
108. Lobstein T, Jackson-Leach R. Planning for the worst: estimates of obesity and comorbidities in school-age children in 2025. *Pediatr Obes.* 2016;11(5):321-325.
109. de Onis M, Blossner M, Borghi E. Global prevalence and trends of overweight and obesity among preschool children. *Am J Clin Nutr.* 2010;92(5):1257-1264.
110. World Health Organization. Consideration of the evidence on childhood obesity for the Commission on Ending Childhood Obesity: Report of the ad hoc working group on science and evidence for ending childhood obesity. [http://apps.who.int/iris/bitstream/10665/204176/1/9789241510066\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/204176/1/9789241510066_eng.pdf?ua=1). Published 2016. Accessed May 2, 2022.
111. Wang Y, Lobstein T. Worldwide trends in childhood overweight and obesity. *Int J Pediatr Obes.* 2006;1(1):11-25.
112. Ebbeling CB, Pawlak DB, Ludwig DS. Childhood obesity: public-health crisis, common sense cure. *Lancet.* 2002;360(9331):473-482.
113. International Diabetes Federation. IDF Diabetes Atlas 10th Edition. <http://www.diabetesatlas.org>. Published 2021. Accessed Oct 30, 2022.
114. World Health Organization. Hypertension. <https://www.who.int/news-room/fact-sheets/detail/hypertension>. Published 2021. Accessed Aug 20, 2022.
115. Popkin BM, Kim S, Rusev ER, Du S, Zizza C. Measuring the full economic costs of diet, physical activity and obesity-related chronic diseases. *Obes Rev.* 2006;7(3):271-293.
116. Finkelstein EA, DiBonaventura Md, Burgess SM, Hale BC. The Costs of Obesity in the Workplace. *J Occup Environ Med.* 2010;52(10):971-976  
910.1097/JOM.1090b1013e3181f1274d1092.
117. OECD. The Heavy Burden of Obesity: The Economics of Prevention. <https://doi.org/10.1787/67450d67-en>. Published 2019. Accessed Nov 22, 2019.
118. Elgin B. Big Soda's Addiction to New Plastic Jeopardizes Climate Progress. <https://www.bloomberg.com/features/2022-coke-pepsi-plastic-recycling-climate-action/?leadSource=uverify%20wall>. Published 2022. Accessed Oct 29, 2022.
119. Oceana. Just one word: refillables. How the soft drink industry can – right now – reduce marine plastic pollution by billions of bottles each year. <https://oceana.org/reports/just-one-word-refillables/>. Published 2020. Accessed Oct 30, 2022.
120. Our World in Data. CO2 Data Explorer. <https://ourworldindata.org/explorers/co2>. Published 2022. Accessed Oct 30, 2022.
121. Erzin AE, Aldaya MM, Hoekstra AY. Corporate water footprint accounting and impact assessment: the case of the water footprint of a sugar-containing carbonated beverage. *Water Resour Manag.* 2011;25(2):721-741.
122. Hoekstra AY, Chapagain, A.K. Water footprints of nations: Water use by people as a function of their consumption pattern *Water Resour Manag.* 2007;21:35-48.
123. Hoekstra AY. *The water footprint of modern consumer society*. Routledge; 2013.
124. Lenzen M, Moran D, Bhaduri A, et al. International trade of scarce water. *Ecol Econ.* 2013;94:78-85.
125. Nash J. Consuming Interests: Water, Rum, and Coca-Cola from Ritual Propitiation to Corporate Expropriation in Highland Chiapas. *Cult Anthropol.* 2007;22(4):621-639.
126. Lopez O, Jacobs A. In town with little water, Coca-Cola is everywhere. So is diabetes. *NY Times.* 2018;14.
127. de Andrade MA, Watson JE, Maxwell SL. Unveiling the environmental benefits of reducing sugar. *Lancet Plan Health.* 2020;4(11):e497-e498.
128. King LC, van den Bergh J. Sugar taxation for climate and sustainability goals. *Nat Sustain.* 2022.
129. Singh GM, Micha R, Khatibzadeh S, et al. Global, Regional, and National Consumption of Sugar-Sweetened Beverages, Fruit Juices, and Milk: A Systematic Assessment of Beverage Intake in 187 Countries. *PLOS One.* 2015;10(8):e0124845.
130. Popkin BM, Hawkes C. Sweetening of the global diet, particularly beverages: patterns, trends, and policy responses. *Lancet Diabetes Endo.* 2016;4(2):174-186.
131. Malik VS, Hu FB. The role of sugar-sweetened beverages in the global epidemics of obesity and chronic diseases. *Nat Rev Endocrinol.* 2022;18(4):205-218.
132. Moodie R, Bennett E, Kwong E, et al. Ultra-Processed Profits: The Political Economy of Countering the Global Spread of Ultra-Processed Foods - A Synthesis Review on the Market and Political Practices of Transnational Food Corporations and Strategic Public Health Responses. *Int J Health Policy Manag.* 2021;10(12):968-982.
133. Andreyeva T, Marple K, Marinello S, Moore TE, Powell LM. Outcomes Following Taxation of Sugar-Sweetened Beverages: A

- Systematic Review and Meta-analysis. *JAMA Network Open*. 2022;5(6):e2215276-e2215276.
134. United Nations Children's Fund. Implementing Taxes on Sugar-Sweetened Beverages: An overview of current approaches and the potential benefits for children. [https://sunpc.org.pk/wp-content/uploads/2019/05/190328\\_UNICEF\\_Sugar\\_Tax\\_Briefing\\_R09.pdf](https://sunpc.org.pk/wp-content/uploads/2019/05/190328_UNICEF_Sugar_Tax_Briefing_R09.pdf). Published 2019. Accessed Nov 22, 2019.
  135. Summan A, Stacey N, Birckmayer J, Blecher E, Chaloupka FJ, Laxminarayan R. The potential global gains in health and revenue from increased taxation of tobacco, alcohol and sugar-sweetened beverages: a modelling analysis. *BMJ Global Health*. 2020;5(3):e002143.
  136. Liu S, Veugelers PJ, Liu C, Ohinmaa A. The Cost Effectiveness of Taxation of Sugary Foods and Beverages: A Systematic Review of Economic Evaluations. *Applied health economics and health policy*. 2021:1-14.
  137. Fuchs Tarlovsky A, Mandeville K, Alonso Soria AC. Health and Distributional Effects Taxing Sugar-Sweetened Beverages: The Case of Kazakhstan. *World Bank*. 2020.
  138. Chaloupka FJ, Powell LM, Warner KE. The use of excise taxes to reduce tobacco, alcohol, and sugary beverage consumption. *Annu Rev Publ Health*. 2019;40:187-201.
  139. Brownell KD, Farley T, Willett WC, et al. The Public Health and Economic Benefits of Taxing Sugar-Sweetened Beverages. *New Engl J Med*. 2009;361(16):1599-1605.
  140. Park H, Yu S. Policy review: Implication of tax on sugar-sweetened beverages for reducing obesity and improving heart health. *Health Policy Techn*. 2019.
  141. The Task Force on Fiscal Policy for Health. Health Taxes to Save Lives. <https://www.bbhub.io/dotorg/sites/2/2019/04/Health-Taxes-to-Save-Lives.pdf>. Published 2019. Accessed Nov 22, 2019.
  142. Andreyeva T, Chaloupka FJ, Brownell KD. Estimating the potential of taxes on sugar-sweetened beverages to reduce consumption and generate revenue. *Prev Med*. 2011;52(6):413-416.
  143. Go A, Mozaffarian D, Roger V. Sugar-sweetened beverages initiatives can help fight childhood obesity. *Circulation*. 2013;127:e6-e245.
  144. Vandevijvere S, Vanderlee L. Effect of Formulation, Labelling, and Taxation Policies on the Nutritional Quality of the Food Supply. *Current Nutrition Reports*. 2019;8(3):240-249.
  145. Salgado Hernández JC, Ng SW. Simulating international tax designs on sugar-sweetened beverages in Mexico. *PLOS One*. 2021;16(8):e0253748.
  146. Grummon AH, Lockwood BB, Taubinsky D, Allcott H. Designing better sugary drink taxes. *Science*. 2019;365(6457):989-990.
  147. Popkin BM, Ng SW. Sugar-sweetened beverage taxes: Lessons to date and the future of taxation. *PLOS Med*. 2021;18(1):e1003412.
  148. Donaldson E. *Advocating for Sugar-Sweetened Beverage Taxation: A Case Study Of Mexico*. Baltimore, Md.: Johns Hopkins Bloomberg School of Public Health;2015.
  149. Briggs ADM, Mytton OT, Kehlbacher A, et al. Health impact assessment of the UK soft drinks industry levy: a comparative risk assessment modelling study. *Lancet Pub Health*. 2017;2(1):e15-e22.
  150. Roache SA, Gostin LO. The Untapped power of soda taxes: Incentivizing consumers, generating revenue, and altering corporate behavior. *Int J Health Policy Manag*. 2017;6(9):489.
  151. Scarborough P, Adhikari V, Harrington RA, et al. Impact of the announcement and implementation of the UK Soft Drinks Industry Levy on sugar content, price, product size and number of available soft drinks in the UK, 2015-19: A controlled interrupted time series analysis. *PLOS Med*. 2020;17(2):e1003025.
  152. Álvarez-Sánchez C, Contento I, Jiménez-Aguilar A, et al. Does the Mexican sugar-sweetened beverage tax have a signaling effect? ENSANUT 2016. *PLOS One*. 2018;13(8):e0199337.
  153. Grummon AH, Roberto CA, Krieger JW. Is the Association Between Beverage Taxes and Reductions in Sales Driven by Communication of Health Consequences in Addition to Price Increases? *JAMA Network Open*. 2020;3(12):e2032537-e2032537.
  154. Jones-Smith JC, Gordon-Larsen P, Siddiqi A, Popkin BM. Is the burden of overweight shifting to the poor across the globe[quest] Time trends among women in 39 low- and middle-income countries (1991-2008). *Int J Obes*. 2012;36(8):1114-1120.
  155. Jones-Smith JC, Gordon-Larsen P, Siddiqi A, Popkin BM. Emerging disparities in overweight by educational attainment in Chinese adults (1989-2006). *Int J Obes*. 2012;36(6):866-875.
  156. Di Cesare M, Khang Y-H, Asaria P, et al. Inequalities in non-communicable diseases and effective responses. *Lancet*. 2013;381(9866):585-597.
  157. Stevens G, Dias RH, Thomas KJ, et al. Characterizing the epidemiological transition in Mexico: national and subnational burden of diseases, injuries, and risk factors. *PLOS Med*. 2008;5(6):e125.
  158. Allcott H, Lockwood BB, Taubinsky D. Should we tax sugar-sweetened beverages? An overview of theory and evidence. *Journal of Economic Perspectives*. 2019;33(3):202-227.
  159. Niessen LW, Mohan D, Akuoku JK, et al. Tackling socioeconomic inequalities and non-communicable diseases in low-income and middle-income countries under the Sustainable Development agenda. *Lancet*. 2018;391(10134):2036-2046.
  160. Popkin BM, Corvalan C, Grummer-Strawn LM. Dynamics of the double burden of malnutrition and the changing nutrition reality. *Lancet*. 2020;395(10217):65-74.
  161. Hsu C-C, Lee C-H, Wahlqvist ML, et al. Poverty increases type 2 diabetes incidence and inequality of care despite universal health coverage. *Diabetes care*. 2012;35(11):2286-2292.
  162. Flood D, Seiglie JA, Dunn M, et al. The state of diabetes treatment coverage in 55 low-income and middle-income countries: a cross-sectional study of nationally representative, individual-level data in 680 102 adults. *The Lancet Healthy Longevity*. 2021;2(6):e340-e351.
  163. Jones-Smith JC, Knox MA, Coe NB, et al. Sweetened beverage taxes: Economic benefits and costs according to household income. *Food Policy*. 2022;110:102277.
  164. Petimar J, Gibson LA, Roberto CA. Evaluating the Evidence on Beverage Taxes: Implications for Public Health and Health Equity. *JAMA Network Open*. 2022;5(6):e2215284-e2215284.
  165. Office of the Controller, Rhyndhart R. Data Release: Beverage Tax Revenue and Expenditures. <https://controller.phila.gov/philadelphia-audits/data-release-beverage-tax/>. Published 2022. Accessed Aug 7, 2022.
  166. Lahr ML, Yao Y, Fei D, Lee A. *The Total Economic Impacts of Philadelphia's Beverage Tax*. New Brunswick, NJ: Rutgers Economic Advisory Service (R/ECON™) & The National Institute for Early Education Research;2021.
  167. World Health Organization. Public Health Product Tax in Hungary: an example of successful intersectoral action using a fiscal tool to promote healthier food choices and raise revenues for public health. [https://www.euro.who.int/\\_data/assets/pdf\\_file/0004/287095/Good-practice-brief-public-health-product-tax-in-hungary.pdf](https://www.euro.who.int/_data/assets/pdf_file/0004/287095/Good-practice-brief-public-health-product-tax-in-hungary.pdf). Published 2015. Accessed Aug 21, 2022.
  168. Wrzesniewska-Wal I. Sugar Tax. *Eur Food & Feed L Rev*. 2021;16:54.
  169. World Health Organization. *Sugar-sweetened beverage taxes in the WHO European Region: Success through lessons learned and challenges faced*. World Health Organization. Regional Office for Europe;2022.
  170. Independent Press. Sugar Tax Revenue To Provide For Free Breakfast For Primary School Children. *Independent Press*. 2019. <https://independentpress.cc/sugar-tax-revenue-to-provide-for-free-breakfast-for-primary-school-children/2019/03/19/>. Published March 19, 2019. Accessed August 21, 2022.
  171. Global Food Research Program. Sugary drink taxes around the world. [https://www.globalfoodresearchprogram.org/wp-content/uploads/2022/05/Sugary\\_Drink\\_Tax\\_maps\\_upload.pdf](https://www.globalfoodresearchprogram.org/wp-content/uploads/2022/05/Sugary_Drink_Tax_maps_upload.pdf). Published 2022. Accessed Aug 7, 2022.
  172. Teng AM, Jones AC, Mizdrak A, Signal L, Genç M, Wilson N. Impact of sugar-sweetened beverage taxes on purchases and dietary intake: Systematic review and meta-analysis. *Obes Rev*. 2019.
  173. Rachel Griffith, Martin O'Connell, Kate Smith, Rebekah Stroud. The evidence on the effects of soft drink taxes. IFS Briefing Note BN255 Web site. <https://www.ifs.org.uk/uploads/BN255-the-evidence-on-the-effects-of-soft-drink-taxes.pdf>. Published 2019. Accessed November 5, 2019.
  174. Colchero MA, Popkin BM, Rivera JA, Ng SW. Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: Observational study. *BMJ*. 2016;352.
  175. Colchero MA, Salgado JC, Unar-Munguía M, Molina M, Ng S, Rivera-Dommarco JA. Changes in Prices After an Excise Tax to Sweetened Sugar Beverages Was Implemented in Mexico: Evidence from Urban Areas. *PLOS One*. 2015;10(12):e0144408.
  176. Guerrero-López CM MM, Juan A. Rivera, Colchero MA... Employment changes



- associated with the implementation of the sugar-sweetened beverage and the nonessential energy dense food taxes in Mexico 2016. Cuernavaca.
177. Colchero MA, Rivera-Dommarco J, Popkin BM, Ng SW. In Mexico, Evidence Of Sustained Consumer Response Two Years After Implementing A Sugar-Sweetened Beverage Tax. *Health Affairs*. 2017;36(3):564-571.
  178. Colchero MA, Molina M, Guerrero-López CM. After Mexico Implemented a Tax, Purchases of Sugar-Sweetened Beverages Decreased and Water Increased: Difference by Place of Residence, Household Composition, and Income Level. *J Nutr*. 2017;147(8):1552-1557.
  179. Pedraza LS, Popkin BM, Batis C, et al. The caloric and sugar content of beverages purchased at different store-types changed after the sugary drinks taxation in Mexico. *Int J Behav Nutr Phys*. 2019;16(1):103.
  180. Colchero MA, Guerrero-López CM, Molina M, Rivera JA. Beverages sales in Mexico before and after implementation of a sugar sweetened beverage tax. *PLOS One*. 2016;11(9):e0163463.
  181. Ng SW, Rivera JA, Popkin BM, Colchero MA. Did high sugar-sweetened beverage purchasers respond differently to the excise tax on sugar-sweetened beverages in Mexico? *Public Health Nutr*. 2019;22(4):750-756.
  182. Sánchez-Romero LM, Canto-Osorio F, González-Morales R, et al. Association between tax on sugar sweetened beverages and soft drink consumption in adults in Mexico: open cohort longitudinal analysis of Health Workers Cohort Study. *BMJ*. 2020;369:m1311.
  183. Gračner T, Marquez-Padilla F, Hernandez-Cortes D. Changes in weight-related outcomes among adolescents following consumer price increases of taxed sugar-sweetened beverages. *JAMA Pediatr*. 2022;176(2):150-158.
  184. Barrientos-Gutierrez T, Zepeda-Tello R, Rodrigues ER, et al. Expected population weight and diabetes impact of the 1-peso-per-litre tax to sugar sweetened beverages in Mexico. *PLoS One*. 2017;12(5):e0176336.
  185. Hernández-F M, Cantoral A, Colchero MA. Taxes to Unhealthy Food and Beverages and Oral Health in Mexico: An Observational Study. *Caries Res*. 2021;55(3):183-192.
  186. HM Revenue & Customs. Soft Drinks Industry Levy. <https://www.gov.uk/government/publications/soft-drinks-industry-levy/soft-drinks-industry-levy>. Published 2016. Accessed Aug 13, 2022.
  187. HM Treasury. Soft Drinks Industry Levy comes into effect. <https://www.gov.uk/government/news/soft-drinks-industry-levy-comes-into-effect>. Published 2018. Accessed Aug 13, 2022.
  188. Pell D, Mytton O, Penney TL, et al. Changes in soft drinks purchased by British households associated with the UK soft drinks industry levy: controlled interrupted time series analysis. *bmj*. 2021;372.
  189. Public Health England. Sugar reduction: Report on progress between 2015 and 2019. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/984282/Sugar\\_reduction\\_progress\\_report\\_2015\\_to\\_2019-1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/984282/Sugar_reduction_progress_report_2015_to_2019-1.pdf). Published 2020. Accessed Aug 13, 2022.
  190. South African Revenue Service. Health Promotion Levy on Sugary Beverages. <https://www.sars.gov.za/customs-and-excise/excise/health-promotion-levy-on-sugary-beverages/>. Published 2021. Accessed Aug 13, 2022.
  191. Hofman KJ, Stacey N, Swart EC, Popkin BM, Ng SW. South Africa's Health Promotion Levy: Excise tax findings and equity potential. *Obes Rev*. 2021;22(9):e13301.
  192. Stacey N, Edoka I, Hofman K, Swart EC, Popkin B, Ng SW. Changes in beverage purchases following the announcement and implementation of South Africa's Health Promotion Levy: An observational study. *Lancet Plan Health*. 2021;5(4):e200-e208.
  193. Essman M, Taillie LS, Frank T, Ng SW, Popkin BM, Swart EC. Taxed and untaxed beverage intake by South African young adults after a national sugar-sweetened beverage tax: A before-and-after study. *PLOS Med*. 2021;18(5):e1003574.
  194. Wrottesley SV, Stacey N, Mukoma G, Hofman KJ, Norris SA. Assessing sugar-sweetened beverage intakes, added sugar intakes and BMI before and after the implementation of a sugar-sweetened beverage tax in South Africa. *Public Health Nutr*. 2021;24(10):2900-2910.
  195. Bercholz M, Ng SW, Stacey N, Swart EC. Decomposing consumer and producer effects on sugar from beverage purchases after a sugar-based tax on beverages in South Africa. *Econ Hum Biol*. 2022;46:101136.
  196. National Treasury, Republic of South Africa. Budget Review 2020. <http://www.treasury.gov.za/documents/national%20budget/2020/review/fullbr.pdf>. Published 2020. Accessed July 1, 2022.
  197. Manyema M, Veerman LJ, Chola L, et al. The potential impact of a 20% tax on sugar-sweetened beverages on obesity in South African adults: A mathematical model. *PLOS One*. 2014;9(8):e105287.
  198. Manyema M, Veerman LJ, Tugendhaft A, Labadarios D, Hofman KJ. Modelling the potential impact of a sugar-sweetened beverage tax on stroke mortality, costs and health-adjusted life years in South Africa. *BMC Public Health*. 2016;16(1):405.
  199. City of Philadelphia. Philadelphia Beverage Tax regulations. <https://www.phila.gov/documents/philadelphia-beverage-tax-regulations/>. Published 2017. Accessed Aug 7, 2022.
  200. Roberto CA, Lawman HG, LeVasseur MT, et al. Association of a beverage tax on sugar-sweetened and artificially sweetened beverages with changes in beverage prices and sales at chain retailers in a large urban setting. *JAMA*. 2019;321(18):1799-1810.
  201. Petimar J, Gibson LA, Yan J, et al. Sustained Impact of the Philadelphia Beverage Tax on Beverage Prices and Sales Over 2 Years. *Am J Prev Med*. 2022;62(6):921-929.
  202. Lawman HG, Bleich SN, Yan J, LeVasseur MT, Mitra N, Roberto CA. Unemployment claims in Philadelphia one year after implementation of the sweetened beverage tax. *PLOS One*. 2019;14(3):e0213218.
  203. Marinello S, Leider J, Pugach O, Powell LM. The impact of the Philadelphia beverage tax on employment: A synthetic control analysis. *Econ Hum Biol*. 2021;40:100939.
  204. Edmondson EK, Roberto CA, Gregory EF, Mitra N, Virudachalam S. Association of a Sweetened Beverage Tax With Soda Consumption in High School Students. *JAMA Pediatr*. 2021;175(12):1261-1268.
  205. Gibson LA, Lawman HG, Bleich SN, et al. No Evidence of Food or Alcohol Substitution in Response to a Sweetened Beverage Tax. *Am J Prev Med*. 2021;60(2):e49-e57.
  206. GCC FinTax. Cabinet Decision No. (38) of 2017 on Excise Goods, Excise Tax Rates and the Method of Calculating the Excise Price. [https://www.gccfintax.com/files/2623426\\_cabinet\\_decision\\_38\\_2017\\_excise\\_goods\\_excise\\_tax\\_rates\\_and\\_the\\_method\\_of\\_calculating\\_the\\_excise\\_price.pdf](https://www.gccfintax.com/files/2623426_cabinet_decision_38_2017_excise_goods_excise_tax_rates_and_the_method_of_calculating_the_excise_price.pdf). Published 2017. Accessed Oct 31, 2022.
  207. Mulcahy G, Boelsen-Robinson T, Hart AC, et al. A comparative policy analysis of the adoption and implementation of sugar-sweetened beverage taxes (2016–19) in 16 countries. *Health Policy and Planning*. 2022;37(5):543-564.
  208. Alsukait R, Wilde P, Bleich SN, Singh G, Foltá SC. Evaluating Saudi Arabia's 50% carbonated drink excise tax: Changes in prices and volume sales. *Econ Hum Biol*. 2020;38:100868.
  209. World Health Organization. Fiscal policies for diet and prevention of noncommunicable diseases. <https://www.who.int/publications/i/item/9789241511247>. Published 2016. Accessed Sept 1, 2022.
  210. WHO Regional Office for Europe (Nutrition Physical Activity and Obesity Programme). Using price policies to promote healthier diets. In: Lifecourse DoNDat, ed. Brussels: WHO European Regional Office; 2015:41.
  211. Briggs ADM, Mytton OT, Kehlbacher A, Tiffin R, Rayner M, Scarborough P. Overall and income specific effect on prevalence of overweight and obesity of 20% sugar sweetened drink tax in UK: econometric and comparative risk assessment modelling study. *BMJ*. 2013;347.
  212. Veerman JL, Sacks G, Antonopoulos N, Martin J. The Impact of a Tax on Sugar-Sweetened Beverages on Health and Health Care Costs: A Modelling Study. *PLoS One*. 2016;11(4):e0151460.
  213. Wright A, Smith KE, Hellowell M. Policy lessons from health taxes: a systematic review of empirical studies. *BMC Public Health*. 2017;17(1):583.
  214. World Cancer Research Fund International. Building momentum: Lessons on implementing a robust sugar sweetened beverage tax. <https://www.wcrf.org/policy/our-publications/building-momentum-series/>. Published 2018. Accessed Sept 2, 2022.
  215. Härkänen T, Kotakorpi K, Pietinen P, Pirttilä J, Reinivuo H, Suoniemi I. The welfare effects of health-based food tax policy. *Food Policy*. 2014;49:196-206.
  216. Niebylski ML, Redburn KA, Duhanev T, Campbell NR. Healthy food subsidies and unhealthy food taxation: A systematic review of the evidence. *Nutrition*. 2015;31(6):787-795.
  217. Cobiac LJ, Tam K, Veerman L, Blakely T. Taxes and subsidies for improving diet and population health in Australia: a cost-



- effectiveness modelling study. *PLOS Med.* 2017;14(2):e1002232.
218. Caro JC, Valizadeh P, Correa A, Silva A, Ng SW. Combined fiscal policies to promote healthier diets: Effects on purchases and consumer welfare. *PLOS One.* 2020;15(1):e0226731.
219. Valizadeh P, Ng SW. Would A National Sugar-Sweetened Beverage Tax in the United States Be Well Targeted? *Am J Agr Econ.* 2021;103(3):961-986.
220. Saha S, Nordström J, Scarborough P, Thunström L, Gerdtham U-G. In search of an appropriate mix of taxes and subsidies on nutrients and food: A modelling study of the effectiveness on health-related consumption and mortality. *Soc Sci Med.* 2021;287:114388.
221. Popkin BM, Ng SW. The nutrition transition to a stage of high obesity and noncommunicable disease prevalence dominated by ultra-processed foods is not inevitable. *Obes Rev.* 2022;23(1):e13366.
222. Taillie LS, Reyes M, Colchero MA, Popkin B, Corvalán C. An evaluation of Chile's Law of Food Labeling and Advertising on sugar-sweetened beverage purchases from 2015 to 2017: A before-and-after study. *PLOS Med.* 2020;17(2):e1003015.
223. Thow AM, Rippin HL, Mulcahy G, Duffey K, Wickramasinghe K. Sugar-sweetened beverage taxes in Europe: learning for the future. *Eur J Public Health.* 2022;32(2):273-280.
224. Lauber K, Rippin H, Wickramasinghe K, Gilmore AB. Corporate political activity in the context of sugar-sweetened beverage tax policy in the WHO European Region. *Eur J Public Health.* 2022;32(5):786-793.
225. Jha P, Peto R. Global Effects of Smoking, of Quitting, and of Taxing Tobacco. *New Engl J Med.* 2014;370(1):60-68.
226. World Bank Group. Obesity: Health and Economic Consequences of an Impending Global Challenge. <https://www.worldbank.org/en/topic/nutrition/publication/obesity-health-and-economic-consequences-of-an-impending-global-challenge>. Published 2020. Accessed Oct 29, 2022.
227. Petit P, Mansour M, Wingender MP. *How to Apply Excise Taxes to Fight Obesity*. International Monetary Fund; 2021.