# IDENTIFICATION OF TAX OPTIONS FOR HIGH FAT, SUGAR AND SALT FOODS AND NON-ALCOHOLIC BEVERAGES

## RESULTS OF A RAPID REVIEW FOR THE HEALTHEI PROJECT

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# Glossary of Terms

| | |
|---|---|
| BMI | Body Mass Index |
| DALY | Disability-Adjusted Life Year |
| Duty | a type of tax that's charged specifically on the value of goods and services, such as VAT |
| DPP | Deaths Prevented or Postponed |
| FAH | Food At Home |
| FOP | Front Of Pack |
| FOSD | Fats Oils and Salad Dressings |
| g | Grams |
| GHGE | Green House Gas Emissions |
| HALY | Health-Adjusted Life Year |
| HEALTHEI | Health Economic Analysis incorporating effects on Labour outcomes, Households, Environment and Inequalities |
| HEI | Healthy Eating Index |
| HFSS | High in Fat, Sugar, and Salt |
| Junk food | Food high in salt, sugar, fat but low in nutritional value, including SSB, confectionary, fast food etc |
| kJ | Kilojoules |
| Levy | an obligatory payment to the Government or another organisation |
| PE | Price Elasticity |
| PVLI | Present Value of Lifetime Income |
| QALY | Quality Adjusted Life Years |
| RTD | Ready to drink |
| SNAP | Supplemental Nutrition Assistance Programme |
| SSB | Sugar Sweetened Beverage |
| VAT | Value Added Tax |

# 1 INTRODUCTION

HEALTHEI (**H**ealth **E**conomic **A**nalysis incorporating effects on **L**abour outcomes, **H**ouseholds, **E**nvironment and **I**nequalities*)* plans to explore which HFSS (High in Fat, Sugar, and Salt) food taxes would have the greatest benefits to health, labour and work outcomes, household expenditure, environmental sustainability and inequalities (health and food expenditure) within the food system in the UK. The work is being funded by the National Institute of Health Research (grant ref: NIHR133927) and is being undertaken by a team from several UK institutions (The University of Sheffield, Teesside University and City, University of London). The project will use data synthesised for this project and engage with consumers, policymakers and experts to look at which taxes would have the greatest benefits to health, labour and work outcomes, household expenditure, environmental sustainability and inequalities within the UK food system.

This rapid review briefing aims to summarise published evidence in this area and will be used as a springboard to encourage discussion of HFSS taxation options in workshops and interviews, which will be held during 2023.

Rapid Review Methods

A more flexible approach than a typical academic review was used to gather and synthesise all appropriate literature. We utilised a pre-planned framework to ensure a systematic approach and followed best-practice in our review (www.training.cochrane.org/handbook).

Criteria used: January 2010-December 2022; PubMed, HMIC, Scopus, Google, Mintel/Mintel Food and Drink, Business Source Premier Ultimate; High-income countries (defined by https://data.worldbank.org/income-level/high-income); English language documents only.

Search terms: (food and beverages OR take-away OR junk food OR fast food OR sweet OR confectionery OR snack OR sodium OR salt) AND (tax OR price OR levy OR fiscal). We had no methodological restrictions, quantitative and qualitative analyses were included of experimental, quasi experimental and observational studies.

Screening: All titles and abstracts were screened by two members of the WP1 team; their shortlist was reviewed by the entire WP1 research team. Full text versions of potential studies were assessed by members of the WP1 team, consulting with another member of the WP1 team where any ambiguity existed. Conference proceedings/study protocols were categorised as an "ongoing study". Reference lists of systematic reviews identified through the searches were also hand searched for potential studies.

Extraction: A standardised data extraction template was developed and agreed by the project management group which was used to record study characteristics/key findings. Evidence from the included papers was extracted by reviewers under themes for effectiveness,

costs/unintended consequences, and barriers to implementation. Data quality of papers was not assessed at this stage, but will be examined once tax options are identified.

Tax and related measures for high income countries were included in the study. This report summarises HFSS food and non-alcoholic beverage tax options, their rationales and, where presented, information on outcomes.

This report is composed of three parts plus appendices:

- Part 1: the introduction;
- Part 2: an overview of policy options and rationales;
- Part 3: summaries of tax interventions identified;

The detailed descriptions of the tax options, the rapid review Protocol Inclusion/Exclusion Criteria, PRISMA diagram and references can be found in this document's appendices.

**As you read the briefing, please reflect on the potential desirability, effectiveness and feasibility of different taxation options for HFSS foods and non-alcoholic beverages. The options presented are not exhaustive and we welcome discussion of alternative ideas**.

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# 2 OVERVIEW

## HFSS taxation in the UK

The excess consumption of calories in the UK leads to obesity, which is a cause of diabetes and cardiovascular disease. Unhealthy diets, in which consumers eat excess quantities of food High in Fat, Sugar and Salt (HFSS), are causing ill health and are an influential factor in creating health inequalities.

Increasing the price of HFSS products could reduce the consumption of unhealthy foods, with potential health benefits. There is increased political interest in weight loss due to the Covid-19 crisis. There are many options available to target different food products, or nutrients profiles, at point of sale, or targeting manufacturers. The specification of these policies could impact the overall benefits to health and/or consequences to other sectors (employment, economy, environment) and health inequalities.

There is a need for evidence on the potential health, economic and environmental benefits of food taxes in the UK. However, food taxes may be unpopular, and the negative consequences of food taxes must also be considered. The potential for unintended consequences and adverse effects in the wider system, such as impacts on low-income households, is also needed to identify policies with potential for implementation.

Increasing the prices of unhealthy foods and/or decreasing the prices of healthy foods have been proposed and found to be effective in improving diets (Afshin et al., 2017). HFSS foods are consistently cheaper than healthy foods in the UK and globally (Jones et al., 2014). Therefore, food pricing policies could be used to address health inequalities (Darmon and Drewnowski, 2015).

Fiscal interventions, particularly those that place low demands on peoples' cognitive, social, material and financial resources, are more likely to have equitable effects or reduce inequalities (Adams et al., 2016). Policies targeting HFSS foods may be favourable, compared with taxes targeting red meat which are high calorie, high carbon footprint, but also have high nutritional value (Bohrer, 2017). There is also evidence to suggest greater public support for taxes on sugar than meat (National Food Strategy, 2021). Food subsidies may increase consumption of healthier foods, but they are costly to implement and may lead to unintended consequences, such as an overall increase in calories.

## Taxation options identified from the rapid review

The research team identified three main categories (Hight Fat Salt and Sugar, Meat, and Sugar Sweetened Beverages) which were then further categorised into 6 categories (High Fat, High Salt, High Sugar, Junk Food, Meat, and Sugar Sweetened Beverages) for tax-related measures

for food and non-alcoholic beverage products from the rapid review, and Table 1 summarises the range of options identified from the literature for these foods and beverage products.

*Table 1 – Options for HFSS taxation from a rapid review undertaken November 2022 – January 2023*

| TAX RELATED MEASURES | | HFSS | FAT | SUGAR | SALT |
|---|---|---|---|---|---|
| 1. Product Type | **HFSS foods**<br>- "Junk food[1]"<br>- High fat<br>- High sugar<br>- High salt | <br>x<br>x | <br><br>x | <br><br>x<br>x | <br><br>x<br>x |
| | **Meat** | | x | | x |
| | **SSBs** | | | x | |
| 2. Application of tax | **Levy** | x | | x | |
| | **Duty** | x | x | x | X |

## Rationales for taxation options

From the rapid review we also identified a variety of rationales for why tax measures might be desirable. Table 2 provides an overview of these different rationales, which include changing consumption and affordability, improving health, raising revenue and impacting industry. The purpose of this table is to generate discussion of underlying objectives for these tax measures, asking the question "what are these tax measures trying to achieve?".

*Table 2 – A count of rationales used to describe the aims or justification of taxation policies from studies included in the rapid review*

| TAX RELATED MEASURES | | Change consumption | Change product affordability | Reduce/ prevent harm | Reduce health inequalities | Raise revenue | Impacting industry |
|---|---|---|---|---|---|---|---|
| 1. Product type | **- HFSS foods**<br>- "Junk food[1]"<br>- High fat<br>- High sugar<br>- High salt | **18**<br>6<br>5<br>4<br>3 | **2**<br>1<br>1<br>0<br>0 | **26**<br>10<br>7<br>5<br>4 | **1**<br>0<br>0<br>1<br>0 | **5**<br>3<br>2<br>0<br>0 | **2**<br>**1**<br>**1**<br>**0**<br>**0** |
| | **Meat** | **1** | **0** | **2** | **1** | **0** | **0** |
| | **SSBs** | **35** | **15** | **4** | **6** | **6** | **5** |
| 2. Application of tax | **Duty** | **20** | **6** | **19** | **2** | **2** | **1** |
| | **Levy** | **29** | **11** | **16** | **5** | **8** | **6** |

[1] definitions vary across studies but include HFSS pre-packed foods, non-essential energy dense, thresholds for HFSS, added sugar, salt or energy dense, soft drinks confectionery or snacks, minimal to no nutritional value, price per calorie, added salt and sugar

# A count of rationales used to describe the aims or justification of taxation policies from studies included in the rapid review.

| Tax Related Measures | | Change Consumption | Change Product Affordability | Reduce/ Prevent Harm | Reduce Health Inequalities | Raise Revenue | Impacting Industry |
|---|---|---|---|---|---|---|---|
| Product Type | HFSS Foods | 18 | 2 | 26 | 1 | 5 | 2 |
| | 'Junk Food'* | 6 | 1 | 10 | 0 | 3 | 1 |
| | High Fat | 5 | 1 | 7 | 0 | 2 | 1 |
| | High Sugar | 4 | 0 | 5 | 1 | 0 | 0 |
| | High Salt | 3 | 0 | 4 | 0 | 0 | 0 |
| | Meat | 1 | 0 | 2 | 1 | 0 | 0 |
| | SSBs | 35 | 15 | 4 | 6 | 6 | 5 |

## High Fat

8 Studies

- Health gains and reductions in deaths.
- Quantities purchased and consumed decreased.
- Diet overall is likely to improve.
- Taxes were noted to be regressive.

## High Sugar

7 Studies

- Health gains: morbidity and mortality; reduction in obesity (BMI) and type 2 diabetes.
- A reduction in purchases of sugar.
- Increase in fruit and vegetables purchased.
- Increases in purchases of saturated fat.
- Increases in purchases of salt.
- Price increases in chocolate have complimentary reductions in SSBs, as well as other snacks.
- Taxes were noted to be regressive

## Junk Food*

11 Studies

- Health gains: reduced morbidity and mortality. BMI lowered, decrease in incidences of diabetes and heart disease.
- Reduction in saturated fats and salt intake.
- Increase in fruit and vegetable consumption.
- Dietary quality significantly improved.
- Substitution effects to reduction in polyunsaturated fatty acids.
- Taxes were noted to be regressive.

## High Salt

4 Studies

- Health gains via lowering of BMI and decreasing incidence of diabetes.
- Decreased saturated fat intake.
- Sugar intake increased.
- High-income households show larger absolute changes in the purchase quantities of targeted foods and beverages than low-income households.
- Taxes were noted to be regressive.

## SSB Options

54 Studies

- Decreases in weight/BMI and CVD risk were predicted in many simulations but observed in only one natural experiment.
- Decreases in purchases and consumption of SSBs, as well as calories gained from SSBs.
- Substitutions were noted to other sugar containing foods and beverages.
- Taxes were noted to be regressive.
- Increased costs were passed onto consumers - not always at 100%.

## Meats & SSB Options

2 Studies

- Delay or avert deaths and can be attributed to reduction in cardiovascular disease.
- Reduction in sugar consumption.
- Reduction in fat consumption.
- Reduction in SSB consumption.
- One study found that the taxes were progressive for health.

*Food high in salt, sugar, fat but low in nutritional value, including SSB, confectionery, fast food etc.
HFSS - Foods high in fat, sugar and salt. SSB - Sugar sweetened beverages.

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# 3 OUTCOMES FROM TAX-RELATED MEASURES

## Summary of outcomes of HFSS taxation options

- **Product Type**

  - **HFSS food tax options (Studies=30)**
    - **Junk Food[1] (Studies=11):** *Demonstrated health gains including reduced mortality; lower BMI, diabetes and heart disease Quantities purchased and consumed decreased in natural experiments. Diet overall (kcals, fruit and vegetables, saturated fat, sodium and sugar) is likely to improve from implementation of these taxes, although the taxes were noted to be regressive. Reformulation of sugar and salt could more than double the nutritional benefits of a tax.*

    - **High Fat (Studies=8):** *Demonstrated health gains including reduced morbidity and mortality; reduction in saturated fats and salt intake, as well as increased fruit and vegetable consumption. BMI lowered as well as a decrease in incidences of diabetes and heart disease. Dietary quality significantly improved. There were substitution effects to reduction in polyunsaturated fatty acids, but net improvements still demonstrated.*

    - **High Sugar (Studies=7):** *Demonstrated health gains noted including morbidity and mortality; reduction in obesity (BMI) and type 2 diabetes. Food price increases shown, with generally a reduction in purchases of sugar. Substitution effects were demonstrated with increases in fruit and vegetables and increases in purchases of saturated fat and salt. Overall health benefits were shown. The price elasticity of chocolate and confectionery was highest, and price increases in chocolate is associated with a reduction in purchase of SSBs, as well as a range of other snacks. The effect is most pronounced in low and middle-income groups.*

    - **High Salt (Studies=4):** *Health gains demonstrated via lowering of BMI and decreasing incidence of diabetes. There was an increase in purchasing of fruit and vegetables, a decrease in saturated fat and a decrease in salt purchasing and intake. Sugar intake increased. High-income households show larger absolute changes in the purchase quantities of targeted foods and beverages than low-income households.*

  - **Meats and SSB tax options (Studies=2):** *All scenarios delay or avert deaths and can be attributed to reduction in cardiovascular disease. The combination of meat and SSB taxes demonstrated reductions in sugar, fat and SSB consumption. One study found that the taxes were found to be progressive for health.*

  - **SSB tax options (Studies=54):** *All scenarios demonstrated decreases in purchases and consumption of SSBs, as well as calories gained from SSBs (simulations and natural*

*experiments). Decreases in weight/BMI and CVD risk were predicted in many simulations but observed in only one natural experiment (50% tax). Substitutions were noted to other sugar containing foods and beverages (simulations and natural experiments). The regressive nature of an SSB tax was highlighted (simulations). Increased costs were passed onto consumers - not always at 100% (natural experiments).*

- **Application of tax**
  - **Duty (manufacturer or point of sale)**

    **HFSS (Studies=17):** *Health gains noted. Many reported lowering BMI and diabetes incidence, averting deaths (from coronary heart disease followed by stroke and diet-related cancer deaths). Notable changes seen in purchasing of target nutrient and reduction in caloric intake. Results suggest that high-income households show larger absolute changes in the purchase quantities of targeted foods and beverages than low-income households but that the taxes would be considered regressive. Possible complementary relationships exist, which could create a cumulative positive multiplier effect, and appears pronounced in the low and middle-income groups.*

    **Meats and SSB tax options (Studies=2):** *Significant reductions in total fat, saturated fatty acids and cholesterol intake, and significant increases in fibre. Increased the numbers of deaths prevented from CHD and diabetes.*

    **SSBs (Studies=14):** *Reduction in energy from SSBs, reduction in beverage purchases/consumption and a reduction in the percentage of the obese population, as well as decrease in the obesity risk. The tax was largely passed through to consumers, but SSB prices did not increase proportionally to the tax (<100%).*

  - **Levy (manufacturer or point of sale)**

    **HFSS (Studies=5):** *Expenditures on processed food increased and purchase/consumption declined. Could not significantly move the consumption from the taxed food categories to the untaxed categories.*

    **Meats and SSB tax options (Studies=0)**

    **SSBs (Studies=29):** *Public health impact of beverage taxes could be substantial. Shows a reduction in SSB purchase and consumption, also a reduction of purchased and consumed energy. Prevents new cases of obesity and can reduce associated health harms. Statistically significant ($p < 0.05$) pass-through between 82% and 144% was found; heterogeneous effects across income groups (with lower income households that support a higher burden for the tax).*

## Summary of grey literature (Documents=14)

### Junk Food[1] taxes (Documents=11)

**Five briefing documents concentrated on junk food taxes.** The first (Cornelsen and Carriedo, 2015)) suggested that the effectiveness of a tax in reducing consumption of unhealthy foods and beverages depends on its design. A higher tax rate, combined with gradual increases, and a broader tax base has greater potential to influence health. However, proposals for such taxes are likely to face great opposition from the food and beverage industry. The second (Mytton and Rayner, 2011) also suggested taxing unhealthy food items, based on consideration of the overall nutritional quality of the food including its saturated fat content, salt and added sugar content, similar to the Hungarian approach (Mytton et al., 2007), considering subsidies on fruit and vegetables should also be considered (Nnoaham et al., 2009), and taxing sugar sweetened beverages (Brownell and Frieden, 2009). They note that a common criticism of health-related taxes for food, and tobacco and alcohol, is their regressive nature. The third (Regional Office for Europe, 2015), discussed that in 2011, the Hungarian Parliament passed legislation creating the public health product tax—a tax levied on food products containing unhealthy levels of sugar, salt and other ingredients in an effort to reduce their consumption, promote healthy eating and create an additional mechanism for financing public health services. Four years since the tax was introduced, consumption of taxable unhealthy foods in Hungary has decreased. Many food manufacturers have reduced or eliminated unhealthy ingredients in their products, population awareness of healthy eating has increased, and approximately US$ 219 million in revenue has been raised and earmarked for health spending. The fourth (Obesity Policy Coalition, 2014), supports the recommendation of a 10% junk food tax but only if it was implemented in concert with subsidies to reduce the cost of healthy foods. The fifth document, the National Food Strategy (National Food Strategy, 2021), contained a recommendation to introduce a sugar and salt reformulation tax. They also suggested that some of the revenue from the tax could be used to help to get fresh fruit and vegetables to low-income families.

**Two news articles examined junk food tax;** the first (Anonymous, 2017), reported that Qatari authorities have approved a draft law that could see junk food (fast foods and soft drinks) taxed in the tiny Gulf state, which has one of the world's fattest populations. Within the article, a further link reported that Qatar planned to introduce a 5 percent value-added tax (VAT) in 2018 (Anonymous, 2017). The second (Belluz, 2018) made the case for a junk food (candy, soda, and potato chips) tax in America. Only Hungary and Mexico (excluded from the rapid review) had junk food taxes at the time of writing, (2018); in 2011, Hungary put a 4-cent tax on packaged foods and drinks that contain high levels of sugar and salt in certain product categories, including soft drinks, candy, salty snacks, condiments, and fruit jams. In 2013, Mexico passed an 8 percent tax on foods including snacks, sweets, nut butters, cereal-based prepared products — all “non-essential” foods. In both cases, consumption decreased. In the initial American Journal of Public Health paper (Pomeranz et al., 2018), the researchers found the Hungary model was the ideal since it considers the broader nutritional value of foods, not just calories (as Mexico is doing). The news article (Belluz, 2018) also reported an impact on junk food manufacturers in Hungary, causing about 40 percent of them to tweak recipes in ways that

make them healthier. Junk food taxes seemed to have the greatest effect among low-income groups and people who were big consumers of junk food prior to the tax.

**Three blogs about junk food taxes were located;** the first (Slidell Memorial Hospital, 2018) examined the same data as one of the news articles (Belluz, 2018) and concluded that *"If a junk food tax ever sees the light of day, it's a safe bet it will have the desired effect (decreasing obesity, heart disease, diabetes and other diseases) only if it's implemented in conjunction with public education programs and other measures.".* The second, (Marron, 2015), discussed implementation of a sugar tax in the USA, concluding that *"Focusing on sugar content would bring another benefit. Most sugar tax discussions focus on changing consumer choices. But consumers aren't in this alone. Food and beverage companies and retailers determine what products they make, market, and sell. Taxing drink volumes or the sales value of sugary food gives these companies no incentive to develop and market lower-sugar alternatives. Taxing sugar content, however, would encourage them to explore all avenues for reducing the sugar in what we eat and drink."* The third, (Scott, 2021), examined the recommendations in the previously mentioned National Food Strategy (2021), and suggested that a tax on wholesale sugar and salt, if implemented, would likely to be effective in the UK. Another suggestion is to tax ultra-processed foods rather than specific nutrients like salt or sugar. Half of the UK's diet comes from ultra-processed foods, and evidence shows that these products are damaging our health and increasing risk of obesity (Lane et al., 2021, Monteiro et al., 2018).

**One additional academic source on junk food taxes were found,** which examined the advantages and disadvantages of implementing a junk food tax as an intervention to counter increasing obesity in North America (Franck et al., 2013 ) and showed small excise taxes are likely to yield substantial revenue but are unlikely to affect obesity rates. High excise taxes are likely to have a direct impact on weight in at-risk populations but are less likely to be politically palatable or sustainable.

**Sugar sweetened beverages (Documents=3)**

**One briefing document concentrated on soft drinks.** The final briefing paper (Food and Drink Federation, 2022) examined the UK soft drinks industry levy (SDIL) introduced in 2018 for producers and importers of sugar sweetened soft drinks. Between spring 2012 and spring 2016, prior to the announcement of the levy, manufacturers had already cut sugar from their products by 15.6% (Kantar Worldpanel data).

**The search found one video** (Doctor Khalid, 2022)which suggested using a similar approach to the 2018 SIDL for fast food. The SIDL reduced the sugar intake of a UK household by 10%, because the big companies want to avoid being hit with taxes and ultimately lowered sugar content.

**One additional academic source on sugar sweetened beverages was found;** which discussed the implementation of the proposed sugar tax on sweetened beverages in the UK in 2018 (Vilakazi et al., 2016). The authors suggest learning from Denmark, an implementing a fat tax as a small component of an overall intervention for tackling obesity and its cardio-metabolic consequences.

# 4 APPENDICES

## APPENDIX 1 – Outcome details of HFSS taxation options (Studies=31)

**A) Junk food[1] (Studies=11):** *Health gains and reductions in deaths were demonstrated (simulations);*
*Quantities purchased and consumed decreased (simulations and natural experiments). Diet overall is likely to improve from implementation of these taxes, although the taxes were noted to be regressive.*

| Simulation (Studies=8) | Natural experiment (Studies=3) |
|---|---|
| ● 8% junk food tax demonstrated health gains (expressed in HALYs per 1000 people) of 127 (95% uncertainty interval 96–167; undiscounted) for the 8% junk food tax. Health expenditure savings across the remaining lifespan per capita (at a 3% discount rate) were US$492 (334–694) for the junk food tax. All policies lowered the midpoint BMI in each category. Diabetes incidence fell more than any other disease for all tax options, ranging from a 6·5% fall among women for the junk food tax up to a 32·7% fall among men for the sugar tax. The junk food tax increased the total price index by 0·9%. The 8% junk food tax had more modest effects, increasing vegetables and decreasing saturated fat, polyunsaturated fats and sugar. All policies lowered the midpoint BMI in each category. Most of the health impact of the tax policies was through change in BMI (Blakely et al., 2020) | ● Junk food tax could not significantly shift the consumption from the possibly taxed food categories to the untaxed categories. There was weak evidence that the tax resulted in increased expenditures on untaxed sweet products, such as sugar and fresh bakery products, and decreased amounts of purchases of taxed pre-packed sweets. Expenditures of processed food went up by 6.5% after the introduction of the junk food tax while purchase quantities declined by 3.4%. Results imply a price elasticity of around 0.33. Consumed quantities of processed foods decreased by 3.4% while the consumption of unprocessed foods increased by 1.1%. If the aim of the policy was to significantly decrease the consumption of unhealthy food then the tax could achieve its aim only among the poorest households. The reasons behind this finding can be the higher price sensitivity of low income groups. (Bíró, 2015) |
| ● A 30% junk food tax study found own-price elasticities of −1.99 for salty snacks and chips. Overall this study showed that a 30% tax on the market-controlled ultra-processed junk foods and beverages is linked with a much higher reduction in caloric intake as well as significant reductions in added sugar, sodium, and saturated fats. The study notes that for most of the less healthy food groups, low income households have a higher own-price elasticity, meaning that their consumption of SSBs and 'junk' foods after a tax would reduce relatively more than in mid-high income households. (Caro et al., 2017) | • A 10% HFSS point of sale levy was associated with a 13.2% decrease in the probability of obesity in young male adults but had no significant effect on the prevalence of obesity among young female adults. (Han and Powell, 2011) |
| ● A 10% tax on junk foods demonstrated that | • Since the 2% tax (levy) was implemented in 2015, its gross revenue has been $7.58 million; Revenue decreased in absolute value by 3.2% in 2017, 1.2% in 2018, and 4.6% in 2019, a significant downward trend (P = .02). Funding was disbursed (total: $6,062,335) for local community wellness projects over the 4 years. Unsure as to whether revenue decreases can |

| | |
|---|---|
| premature deaths averted due to a junk food tax accounted for over 8,000 additional working years and a $307 million increase in PVLI. The estimated savings due to increased productivity ($307 million) amounted to approximately 50% of the savings estimated to fall within the health care system alone ($604 million). Deaths averted in men between the ages of 40 to 59, and deaths averted from ischaemic heart disease, were responsible for the largest gains. (Carter et al., 2019)<br>● The simulation focuses on revenue from tax and does not include any health outcomes, although the authors estimate that the health benefits are large. The tax base for identifying ultra-processed foods and beverages, shown to have large impacts on health, is large and impactful on food purchases, and provides significant financial resources for a country. Revenues for all groups could reach between 457 million USD to 1.3 billion USD. These taxes would be considered regressive. (Colchero et al., 2021)<br>● A 20% increase on unhealthy products plus a 20% subsidy for healthier products demonstrated a reduction in purchases of energy from sweet snacks or desserts and puddings (46 kcal and 39 kcal per capita/day, respectively). All changes were found to be higher among low-SES households. Combining price increases on all less healthy food groups with a price decrease on all healthy groups showed that diet overall is likely to improve from such changes, with a reduction in energy purchases by 55–91 kcal, and sugar purchases by 5–9 g, with the higher values seen for low-SES group. The results agree with marketing research that consumer response is generally stronger to price increases. Implications for policy suggest that subsidies need to be relatively larger in magnitude in comparison to taxes to achieve an equivalent change in demand. (Cornelsen et al., 2019)<br>● A 10% junk food tax demonstrated that energy intake would decrease by 174 and 121 kJ per day for males and females, respectively. This equates to a 1.9kg (95% UI: 1.7kg; 2.0kg) reduction in mean population | be explained by reductions in consumption of unhealthy foods or other factors, such as changes in the food store environment. The public health implications of the current work are that a 2% unhealthy food tax in a rural, tribal area generated about $13,000 per rural community per year, that modest reductions of 1% to 4% annually can be expected, and that distributing funds to small local communities for wellness projects appears feasible within tribal government structures. (Yazzie et al., 2020) |

| | |
|---|---|
| body weight for males and a 1.3 kg (95% UI: 1.2 kg; 1.4 kg) reduction for females or a 1.6 kg (95% UI: 1.5 kg; 1.7 kg) reduction for the affected population as a whole. The tax intervention results in 559 000 DALYs averted. The intervention is likely to be regressive; however, the health benefits of the tax are also likely to be relatively greater in lower income groups. (Sacks, 2011)<br><br>● A 20% increase in the taxes on fast food showed a lowering of the probability of fast-food consumption by 3%, whereas improving the visibility of positive social norms by 10%, either through community-based or mass-media campaigns, could improve the consumption of fruits and vegetables by 7% and lower fast-food consumption by 6%. (Zhang et al., 2014)<br><br>● A £3 per kilo tax on wholesale sugar and £6 per kilo tax on wholesale salt could lead to a £4-5 price increase in home purchases and £0.9-1.4 increase in out of home prices. The tax would reduce sugar consumption by a minimum of 7g per person per day without reformulation and 13g per day with reformulation. Salt consumption would reduce by a minimum of 0.2g per person per day without reformulation and 0.7g per day with reformulation. The sugar tax add 344-962 QALYs and salt tax 537-1474 QALYs. Reductions in NHS costs range from £1,363m to £3,814m across sugar tax scenarios, and £1,644m-£4,482m for social care costs (Griffith, 2021) | |

**B) High Fat (Studies=8)** *Demonstrated health gains including reduced morbidity and mortality, and improvements in dietary quality. BMI lowered as well as a decrease in incidences of diabetes and heart disease. Reduction in saturated fats and salt intake, as well as increasing fruit and vegetable consumption. There were substitution effects to reduction in polyunsaturated fatty acids although net improvements still demonstrated.*

| **Simulation (Studies=7)** | **Natural experiment (Studies=1)** |
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| ● A 10% point of sale tax on fat had small and ambiguous effects on nutrients purchased by French households, and a slight effect on body weight in the short run, with a greater effect in the long run. Such a tax generates substantial tax revenue but is highly regressive. This tax leads to small changes in the short run, with more substantial changes in the long run. (Allais et al., 2010)<br>● A 3% saturated fat tax found health gains (expressed in HALYs per 1000 people) of 361 (275–474). The tax gave a 10·3% (7·4 to 13·6) reduction in saturated fats, increased fruit and vegetable consumption and reduced salt. The policy lowered the midpoint BMI. Diabetes incidence fell more than any other disease. There were also deleterious substitution effects; the saturated fat tax reduced polyunsaturated fatty acids but was not severe as manifested by net improvements in disease incidence and HALYs gained. The biggest health impact of the tax policy was through change in BMI. (Blakely et al., 2020).<br>● A 10% manufacturer duty on saturated fat, (combined with an average change in the price of food and drink products of 10%: salt, sugar and SSBs) indicated that the combination of these taxes and subsidy could avert as many as 470,000 disability-adjusted life years (95% uncertainty interval: 420,000 to 510,000) in the Australian population of 22 million. A net cost-saving of AU$3.4 billion (AU$2.4 billion to AU$4.6 billion; US$2.3 billion) to the health sector. The simulations indicated that the combination of the taxes and subsidy could avert as many as 470,000 disability-adjusted life years (95% uncertainty interval). In terms of health gains, 97,000 (77,000-120,000) DALYs were averted. (Cobiac et al., 2017). | • The Danish fat tax (foods containing more than 2.3% saturated fat - including dairy produce, meat and processed foods - were subject to the measure which added 16 kroner ($2.70 / £1.50) per kg of saturated fats in a product. The tax was repealed but then evidence was published showing that consumption of saturated fat had declined in Denmark, and was effective in changing consumer behaviour. (Vallgårda et al., 2015) |

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| ● A 20% point of sale duty on Fats, Oils and Salad Dressings (FOSD) showed that although the magnitudes of the changes in the quality of all diet groups are small, FOSD taxes significantly affect the diet quality. The average total healthy eating index (HEI) changed from 56.21 to 56.24 with a FOSD tax. Simulation of tax scenarios indicates that a tax on sugar-sweetened beverages may be more efficient than a tax on FOSDs in improving consumer diet quality. There was no evidence of substitution to sugary foods and the results show that complementary foods could contribute to decreasing energy purchases. (Gao et al., 2013).<br><br>● A 20% point of sale duty on fat looked at deaths prevented or postponed (DPP). The result was 1,500 (950 to 2,100) DPP (5.0%). A saturated fat tax would reduce saturated fat and sodium purchases by approximately 6% each. Relative to other strategies to prevent obesity and diet-related disease, health-related food taxes and subsidies are likely to be highly cost-effective. For all scenarios modelled, most mortality averted (70–85%) would be from deaths due to cardiovascular disease. For all other scenarios, 69–73% of DPP would be from cardiovascular disease, 11–14% from diabetes, 11–13% from cancers, and 3–4% from other causes (chronic obstructive pulmonary disease, kidney disease, liver disease or epilepsy). There is a risk of unintended consequences such as shifts from taxed foods to others that are equally or even more unhealthy. It was assumed that the tax/subsidy pass-through rate to the consumer was 100%. This may not be the case since food manufacturers or retailers might choose to absorb some of the increase in price or increase price beyond the minimum required. (Ni Mhurchu et al., 2015).<br><br>● A 25% VAT on products rich in saturated fat; and a 34.4% VAT on products rich in saturated fat combined with a 10.4% VAT (i.e. a subsidy) on fruits and vegetables was simulated. Combination of these taxes could avert or postpone substantial numbers of deaths (almost 2100 - 95% CI). Most of the deaths | |

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| averted / delayed would be from coronary heart disease followed by stroke and diet-related cancer deaths. Predict that an increase in the current VAT to 25% on products rich in saturated fat plus a 0% VAT on fruits and vegetables would result in almost 1100 deaths averted or postponed (95% CI: 832 - 1363) in a year in Sweden, while the combination of a 34.4% VAT on products rich in saturated fat and a 10.4% VAT (i.e. a subsidy) on fruits and vegetables would result in almost 2100 (95% CI: 1572-2311) deaths averted or postponed corresponding to a 4.8% reduction in diet-related annual death. Health-related food taxes and subsidies improve dietary habits as well as reduce the mortality of the Swedish population. However, the effect of these reforms on different socioeconomic classes and which reforms provide the best value for money, i.e., cost-effectiveness of these reforms needs to be established first before implementation. (Saha et al., 2021)<br><br>● The Danish saturated fat tax (6 DKK/kg saturated fat(2.14€/kg)) had a substantial effect on the consumption of saturated fat, with reductions in consumption across all age-sex groups, ranging from 4.9% for middle-aged women to 1.6% for older men (on average the decrease in consumption of saturated fat was 4%). Vegetable consumption increased by 7.9% on average and fibre consumption increased by 3.7%. Salt consumption increased for all age groups, except younger females, and fruit consumption decreased for younger men and women and for older women. The tax successfully reduced saturated fat intake, as well as the intake of other fats, for all combinations of gender and age. (Smed et al., 2016) | |

**C) High Sugar (Studies=7):** *Demonstrated health gains noted including morbidity and mortality; reduction in obesity (BMI) and type 2 diabetes. Food price increases shown, with generally a reduction in purchases of sugar, increase in fruit and vegetables purchased. Substitution effects were demonstrated with increases in purchases of saturated fat and salt, although health benefits were shown. The price elasticity of chocolate and confectionery was highest, and price increases in chocolate is associated with a reduction in purchase of SSBs, as well as a range of other snacks. The effect is most pronounced in the low and middle-income groups.*

| **Simulation (Studies=7)** | **Natural experiment** |
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| ● Capping added-sugar emissions into the food supply by food manufacturers at a rate of 1% per year would be expected to reduce the prevalence of obesity by 1.7 percentage points (95% confidence interval [CI] = 0.9, 2.4; a 4.6%. This cap-and-trade policy to reduce added-sugar intake may reduce obesity and type 2 diabetes to a greater extent than currently proposed excise taxes. The reduced added-sugar emissions would also be expected to lower type 2 diabetes incidence by 21.7 cases per 100 000 people (95% CI = 12.9, 30.6), a 4.2% lower incidence rate. Consumers faced an average food price increase of $7.21 per year from added-sugar-product purchases (95% CI = $3.81, $10.63), or about $0.02 per person per day, as a result of the permit cost being passed to consumers. (Basu and Lewis, 2014)<br>● A 3.4% sugar tax, applied as a manufacturer duty, looked at health gains (expressed in HALYs per 1000 people) which was 581 (429–792). Health expenditure savings across the remaining lifespan per capita (at a 3% discount rate) were $2164 (1472–3122). The sugar tax gave a 33·3% (26·4 to 45·2) reduction in sugar purchases. A beneficial substitution effect from the sugar tax led to increased fruit and vegetables and lowered the midpoint BMI. Diabetes incidence fell 32·7% fall among men. There were also deleterious substitution effects; the sugar tax increased saturated fat and salt. However, the substitution effects that were potentially deleterious to health were not severe as manifested by net improvements in disease incidence and HALYs gained. Most of the health impacts were through a change in BMI (Blakely et al., 2020)<br>● 18% tax on sweet and salty snacks estimated | |

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| an overall purchase decrease of 13.4% (1.39 kilograms) of sweets and snacks. There is also a slight substitution towards higher vegetable purchases of 0.8% (0.23 kilograms). Results by household income suggest that high-income households show larger absolute changes (in kilograms/liters per household/month) in the purchase quantities of targeted foods and beverages than low-income households. There is significant heterogeneity in the tax burden of policy 1 between low- and high-income households. The lowest income (quintile 1) households report a much larger tax burden relative to their income, than highest income (quintile 5) households (0.96% versus 0.26%). (Caro et al., 2020)<br><br>● The 10% sugar tax produced the biggest gains in health, (followed by the salt tax, the saturated fat tax, and the sugar-sweetened beverage tax). However, combination of the taxes and subsidy could avert as many as 470,000 disability-adjusted life years (95% uncertainty interval: 420,000 to 510,000) in the Australian population of 22 million. A net cost-saving of AU$3.4 billion (AU$2.4 billion to AU$4.6 billion) to the health sector. The simulations indicated that the combination of the taxes and subsidy could avert as many as 470,000 disability-adjusted life years (95% uncertainty interval). Health gain, DALYs averted - saturated fat tax 97,000 (77,000 – 120,000), excess salt tax 130,000 (120,000 - 140,000), sugar sweetened beverage tax 12,000 (2,100 – 21,000), sugar tax 270,000 (250,000 - 290,000). (Cobiac et al., 2017)<br><br>• Results of a 10% sugar tax indicate that people would not reduce the consumption of other types of food to meet their increase in the consumption of fish, fruit and vegetables. Using the same procedure as in the case of the sugar tax, VAT cuts would lead to a 0.9% increase in the incidence of CHD via weight gain, but this increase is not significant (95% CI 0.8, 2.8). If income class dependent elasticities are used, the weight loss is higher for individuals in low-income households than for those living in households with a higher disposable income.(Härkänen et al., 2014) | |

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| ● An 80% increase in tax on candy, (5.8% tax) showed the volume price of taxed candy increased 5.8 percentage points more in the intervention season in comparison to the control season, but no reductions in sales were detected. The tax increases were too modest to affect the prices to alter sales sufficiently. (Øvrebø et al., 2020)<br>● 1% sweet snack tax showed that the elasticity for chocolate and confectionery is −0.74, biscuits −0.69 and cakes −0.66. Low-income households are relatively more price responsive (−0.74 and −0.71, respectively, in comparison to −0.64 and −0.53 in high-income group). The price elasticity of chocolate and confectionery was highest among the sweet snacks. Price increases in chocolate are associated with a reduction in purchase of SSBs, as well as a range of other snacks, and suggests they have stronger associations with reductions in other categories of foods and SSBs (i.e., complementary relationships), creating a cumulative positive multiplier effect. This appears to be most pronounced in the low and middle-income groups, as would be expected. (Smith et al., 2018) | |

**D) High Salt (Studies=4):** *Health gains demonstrated via lowering of BMI and decreasing incidence of diabetes. There was an increase in purchasing of fruit and vegetables, and a decrease in salt purchasing and intake. There were beneficial substitution effects of an increase of fruit and vegetables and decreased saturated fat intake, although sugar intake increased. High-income households show larger absolute changes in the purchase quantities of targeted foods and beverages than low-income households.*

| Simulation (Studies=4) | Natural experiment |
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| ● A 3.4% salt tax demonstrated health gains of 375 (272–508) (HALYs per 1000 people) for the salt tax. Health expenditure savings were seen across the remaining lifespan. The salt tax gave a 12·0% (9·4 to 15·9) reduction in salt purchasing. Beneficial substitution effects included the salt tax increasing fruit and vegetables and decreased saturated fat intake. All policies lowered the midpoint BMI. Diabetes incidence fell more than any other disease for all tax options. The salt tax gave a 12.0% reduction in salt. There were also deleterious substitution effects as the salt tax increased sugar. Most of the health gains arose because of reductions to BMI, even for the salt tax (high salt foods are often energy dense). Substitution effects that were potentially deleterious to health were not severe as manifested by net improvements in disease incidence and HALYs gained across all scenarios. Most of the health impact of the tax policies was through change in BMI. (Blakely et al., 2020)<br><br>● An 18% tax on salty snacks revealed an overall purchase decrease of 13.4% (1.39 kilograms) of sweets and snacks and 3.4% (0.7 liters) of beverages. There is also a slight substitution towards higher vegetable purchases of 0.8% (0.23 kilograms). Results by household income suggest that high-income households show larger absolute changes (in kilograms/liters per household/month) in the purchase quantities of targeted foods and beverages than low-income households. There is significant heterogeneity in the tax burden of policy 1 between low- and high-income households. The lowest income (quintile 1) households report a much larger tax burden relative to their income, than highest income (quintile 5) households (0.96% versus 0.26%). | |

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| (Caro et al., 2020)<br><br>● The 10% salt tax produced the second biggest gains in health, (preceded by the sugar tax, and followed by the saturated fat tax, and the sugar-sweetened beverage tax). However, a combination of the taxes and subsidy could avert as many as 470,000 disability-adjusted life years (95% uncertainty interval: 420,000 to 510,000) in the Australian population of 22 million. A net cost-saving of AU$3.4 billion (AU$2.4 billion to AU$4.6 billion) to the health sector. The simulations indicated that the combination of the taxes and subsidy could avert as many as 470,000 disability-adjusted life years (95% uncertainty interval). Health gain, DALYs averted - excess salt tax 130,000 (120,000 - 140,000). (Cobiac et al., 2017)<br><br>● 20% sodium tax resulted in 2,000 (1300 to 2,700) DPP (6.8%). A sodium tax would reduce sodium intakes by approximately 11% but would result in a 2% increase in saturated fat purchases due to positive cross-PEs between pork and products high in sodium. It was assumed that the tax/subsidy pass-through rate to the consumer was 100%. (Ni Mhurchu et al., 2015) | |

## APPENDIX 2 - Outcome details of Meat (animal flesh excluding fish) and SSBs taxation options (Studies=2)

*All scenarios delay or avert deaths and can be attributed to reduction in cardiovascular disease. The combination of meat and SSB taxes demonstrated reductions in sugar, fat and SSB consumption. One study found that the taxes were found to be progressive for health.*

| Simulation (Studies=2) | Natural experiment |
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| **Meats and 20% SSB tax**<br>● Four scenarios were examined. *A) GHGEs tax of £2.86/tCo2e/100g on all products with emissions greater than the mean across all food groups, B) scenario A but with subsidies on foods with emissions lower than 0.36 kgCo2e/100g C) scenario A with a 20% sales tax on SSBs and D) scenario B with a 20% sales tax on SSBs.* All scenarios delay or avert deaths. Across all scenarios, the majority of deaths delayed or averted can be attributed to increases in fibre intake and reductions in fat consumption; an increase in salt consumption resulted in significant changes in the other direction. Health outcomes are predominantly attributable to changes in deaths from cardiovascular disease and cancer. All tax scenarios resulted in significant reductions in total fat, saturated fatty acids and cholesterol intake, and significant increases in fibre. Fruit and vegetable consumption varied between scenarios with significant increases in consumption in scenarios B and D, and significant reductions in scenarios A and C. Sugar consumption significantly increased in A and B but the introduction of the SSB tax in C and D resulted in total sugar consumption being significantly reduced. Across all four tax scenarios, purchases of beef, lamb, and other meat significantly decreased by approximately 21%, 17%, and 12% respectively, alongside 12% and 10% increases in the amount of pork and poultry purchased respectively. There were also significant increases across all the scenarios in purchases of bread, cereals, and flour; Cakes, buns, pastries, and biscuits; and sweets. Taxing SSBs in scenarios C and D resulted in significant reductions in the two not-low-calorie soft drink categories, with greater reductions found in scenario D. Scenarios A and C have the possibility of | |

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| generating £3.0 billion and 3.4 billion pounds in revenue respectively with the difference being attributable to the SSB tax in scenario C. In scenario D where SSBs are also taxed, the result is a £120 million reduction in revenue. (Briggs et al., 2016)<br><br>**SSB plus processed meats tax**<br>● *(1b) national 10% subsidy and 10% SSB and processed meats tax, (2b) national 30% subsidy and 30% SSB and processed meats tax, (3b) national 10% subsidy and 10% SSB and processed meats tax plus 30% subsidy for SNAP purchases simulation.* Adding a national 10% tax (intervention 1b) increased the numbers of both CHD and diabetes deaths prevented. Overall, this intervention was estimated to prevent 5.9% of all CMD deaths among SNAP participants, 4.8% among SNAP-eligible non-participants, and 4.1% among SNAP-ineligible non-participants. The combined national 30% subsidy and 30% tax (intervention 2b) had larger absolute benefits and similarly reduced disparities, preventing 11.5% of CHD deaths, 15.2% of stroke deaths, and 16.2% of diabetes deaths among SNAP participants. The combination of 10% national subsidy, 10% national tax, and 30% SNAP-targeted subsidy (intervention 3b) was estimated to reduce US CMD deaths by 10.2% for SNAP participants, 4.8% for SNAP-eligible non-participants, and 4.1% for SNAP-ineligible non-participants, representing 37,500 deaths/y prevented nationally. (Wilde et al., 2018) | |

## APPENDIX 3 - Outcome details of SSB taxation options (Studies=54)

**A) 2-10% sales tax / 0.5 - 1 cent per ounce (Studies=21):** *Decreases were seen in purchases of, consumption of and calories from SSBs in both simulations and natural experiments. Decreases were predicted in weight/BMI and CVD risk (simulations) but not observed in natural experiments. Substitutions of non-taxed caloric beverages, salt and sodium were predicted to decrease the marginal effects of the SSB tax, but the overall caloric intake was still reduced (simulations). Low-income households were predicted to make larger reductions than higher-income households for SSB purchases (simulations). The regressive nature of an SSB tax was noted (simulations).*

| **Simulations (Studies=12)** | **Natural Experiments (Studies=8)** |
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| ● Estimated reduction per capita SSB from 45 gal to 40gal (2009 to 2015). Reduction of SSB consumption of 24%, and a reduction from 190-200 cal to 145-150 cal (assumption that there is no substitution to other caloric intake) (Andreyeva et al., 2011)<br><br>● A tax on SSBs purchased with SNAP dollars would produce higher cost savings due to tax revenues but avert fewer chronic disease, had about 20% lower benefits in terms of AHEI and BMI and about 60% lower benefits for diabetes risk and CVD mortality (compared to banning SSB purchases using SNAP benefits). (Basu and Lewis, 2014)<br><br>● A mean reduction in energy intake of 2.1 kcal/person/day. Predicted to reduce the percentage of the obese adult population (body mass index [BMI] ≥30 kg/m2) by 1.3%, equating to 9,900 adults (95% credible intervals: 7,750 to 12,940), and the overweight or obese population (BMI ≥ 25 kg/m2) by 0.7%, or 14,380 adults (9,790 to 17,820). Reductions in obesity are similar for men (1.2%) and women (1.3%), and similar for each income group (between 1.1% and 1.4% across income groups). Reductions in obesity are greater in young adults than older adults (e.g. 2.9% in adults aged 18–24 years vs 0.6% in adults aged 65 years and over). (Briggs et al., 2013)<br><br>● Price increases of 10% on SSBs were associated | • A one percentage point increase in the soft drink tax rate reduces the amount of calories consumed by soda by nearly 6 cal, which is about 5% of the average calories from soda. Although there is no evidence that soft drink taxes improve weight outcomes in children and adolescents, the fact that children and adolescents substitute more nutritious whole milk for soft drinks when taxed suggests that there may be broader health benefits that are not yet understood. The reduction in soda consumption is completely offset by increases in consumption of other high-calorie drinks. (Fletcher et al., 2010c)<br><br>• Neither vending machine restrictions nor soft drink taxes will lead to noticeable weight reduction in children. In particular, our results suggest that typically imposed beverage taxes are neither large enough nor transparent enough to lead to meaningful behavioural change. Likewise, vending machine bans may redirect how children access soft drinks but not whether they access soft drinks. (Fletcher et al., 2010b)<br><br>● 2% additional tax on unhealthy beverages demonstrated water purchasing among respondents increased significantly from 2017 to 2019 (24.4% to 32.8%;P =0.03). Shoppers in 2019 were 1.5times more likely to purchase water compared with 2017 (adjusted P =0.01). There was a trend toward reduced SSB purchasing (85.8% in 2017, 80.3% in 2019,P=0.068), while produce purchasing |

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| with fewer purchases of juice drinks, whereas price increases of 10% simulated on both SSBs plus >1% fat and/or high-sugar milk (combined tax) were associated with fewer kilocalories purchased from >1% fat, low-sugar milk, and meat, poultry, fish, and mixed meat dishes. The study provides evidence that a tax on beverages high in sugar and/or fat may be associated with favourable changes in beverage purchases among US households with a preschool child. (Ford et al., 2015)<br><br>● Three of the seven interventions (SSB excise tax, elimination of the tax deduction, and nutrition standards for food and beverages sold in schools outside of meals) saved more in health care costs than they cost to implement. Each of the three interventions prevented 129,000-576,000 cases of childhood obesity in 2025. The results highlight the importance of primary prevention for policy makers aiming to reduce childhood obesity. Sugar-sweetened beverage excise tax (excise tax of one cent per ounce on sugar-sweetened beverages) was projected to prevent 576,000 cases of childhood obesity in 2025. The net savings to society for each dollar spent was projected to be $30.78 (Gortmaker et al., 2015)<br><br>● Evidence that a tax-induced sugar-sweetened beverage price increase would reduce total sugar-sweetened beverage purchases among Supplemental Nutrition Assistance Program participants, who were driven by purchase shifts away from taxed sodas and sports drinks to non-taxed beverages (bottled water, juice, milk). The substitution of non-taxed caloric beverages decreases the marginal effects of the sugar-sweetened beverage tax, yet the direct tax effects are large enough to reduce the overall caloric intake, with the average net reduction in monthly calories from sugar-sweetened beverages estimated at around 8% for a half-cent per ounce tax and 16% for a one cent per ounce tax. (Jithitikulchai and Andreyeva, 2018) | remained unchanged over time, at approximately 17%. Most shoppers (56.6%) were aware of the tax; of these, 35.6% attributed healthier habits to the tax, most commonly buying more healthy drinks (49.2%), fewer unhealthy drinks (37.7%), more healthy snacks (31.1%), and fewer unhealthy snacks (26.2%). (Lalla et al., 2022)<br><br>● DID estimates indicate that in fast-food restaurants, on average, after two years following implementation of tax, the price of bottled regular soda increased by 1·44 cents/oz (95 % CI 0·50, 2·73) (tax pass-through rate of 144 %) and the price of bottled diet soda increased by1·17 cents/oz (95 % CI 0·07, 2·13). No statistically significant differences were found between bottled regular and diet soda price increases. Price effects for unsweetened beverages and fountain drinks were not statistically significant. Further, the estimated price change for fountain drinks was nearly zero. Findings suggest that the effectiveness of SSB taxes in discouraging SSB consumption may be limited in fast-food restaurants in Oakland, California, because there were similar price increases in taxed and untaxed bottled soda and no changes in fountain drink prices. (Marinello et al., 2021)<br><br>● The natural experiment demonstrated statistically significant ($p < 0.05$) pass-through of 82% for bottled regular soda one year after the tax was implemented. This effect represents an 8% increase in prices from baseline. No statistically significant changes in prices were found in either time period for taxed and untaxed fountain drinks and untaxed bottled diet soda. The effective price increase of regular soda was 8%, which is much lower than the 20% suggested by the World Health Organization to meaningfully improve health outcomes. Using an estimated average price elasticity of demand of −1.2for SSBs, a price increase of 8% is expected to reduce demand by just under 10%. In summary, nearly full tax pass-through to prices of bottled regular soda was found in |

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| ● A tax of $0.01 per ounce on all SSBs is predicted to reduce consumption by 32 kcal/day. Predicted to reduce SSB consumption by 9% with lower bounds of 3% and upper bounds of 15% (Levy and Friend, 2013)<br><br>● The levy can be expected to reduce consumption, reducing the volume of soft drinks sold by 1.6 percent, or 0.4 percent if we assume some consumers will switch to milk. The changes in sales volumes and patterns of consumption equate to a reduction in the average daily calorie intake of five calories per person. We estimate that the levy could raise £504 million in tax revenue for the Exchequer. However, the soft drinks tax can be expected to result in more than 4,000 job losses across the UK. (Oxford Economics, 2016)<br><br>● The combination of a 10% SSB price increase for all, a 30% price reduction in total F&Vs for SNAP participants and a 10% price reduction for SNAP-eligible non-participants and SNAP-ineligible individuals, and a national F&V and SSB MMC for all might best achieve the goal of reducing both the overall mortality burden and CVD disparities. This approach could potentially generate approximately 12,800 deaths prevented or postponed (DPPs) in 2030 and thus reduce CVD disparities by approximately 6.0 deaths per 100,000. (Pearson-Stuttard et al., 2017)<br><br>● SSB taxes can effectively reduce SSB consumption. Higher SSB purchasing households made larger reductions (per adult equivalent) in SSB purchases than lower SSB purchasers due to the tax (e.g., 4.4 oz/day at SSB purchase percentile 90 compared with 0.5 oz/day at percentile 25; P < 0.05). Our analyses by household income indicated low-income households would make larger reductions than higher-income households at all SSB purchase levels. (Valizadeh et al., 2021) | fast-food restaurants one year after the Oakland, CA,SSB tax was implemented. The estimated effects indicate that the tax impact on prices is gradual and may not be effective at deterring SSB consumption in fast-food restaurants because restaurants do not appear to be price differentiating between taxed and untaxed. Also, the magnitude of the price increase may not be sufficient to improve nutrition and reduce obesity and other non-communicable diseases. (Marinello et al., 2020)<br><br>● 8% SSBs tax increased the volume price of taxed soda by 8.0 percentage points, but not able to detect reductions in sales that coincided with an increase in the taxes. Speculate that the tax increases were too modest to affect the prices to alter sales sufficiently. (Øvrebø et al., 2020)<br><br>● In the approximately 2-year pretax implementation period the mean total weekly volume of taxed products sold in Cook County was 289.42 million fluid ounces, which decreased to 206.04 million fluid ounces per week while the tax was in place and then increased to a weekly mean of 272.37 million fluid ounces during the 8-month post tax repeal period. The volume sold of untaxed products in Cook County, as well as taxed and untaxed products in St Louis, remained generally unchanged " (Powell and Leider, 2020)<br><br>● There was no significant relationship between differential soda taxes and overall soda consumption for the whole population. This means that, within the limitations of our analysis, increasing the differential tax on soda doesn't affect total soda consumption. We found a significant relationship between differential soda taxes and BMI change from third to fifth grades. The existing variation in taxes on soda is not very large—up to 7 percent, with a mean differential of 3.5 percent. Our results suggest that such small |

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| ● As a result of the tax, the long-run reduction in household sugar-sweetened bever-age demand is between 118 and 135 12-ozcans per year for low-income households and between 110 and 128 12-oz cans per year for high-income households. The tax is estimated to boost milk consumption by both income strata in most cases, although the estimated effects are not statistically significant for low-income households. (Zhen et al., 2011)<br><br>● About one-half of the reduction in SSB calories is offset by increases in calories from other foods and beverages on average. The net effect of a price increase of this magnitude is a reduction of 7.9 kcal per capita per day; it is predicted to increase daily per capita fat and sodium intakes by 0.2 g and 49.8 mg, respectively. The SSB reduction is larger for low-income households than for high-income households because low-income households reported higher quantities of SSBs. The SSB price increase also induces declines in milk, 100% juice, and bottled water but an increase in diet CSDs. SSBs as a group are a net complement to non-SSBs except diet CSDs. The difference in welfare loss between low- and high-income households reinforces the regressive nature of an SSB tax. The model predicts that a half-cent per ounce SSB tax would generate about $20 per year per household on average in tax revenue. (Zhen et al., 2014) | taxes are unlikely to have measurable effects on soda consumption or obesity among children overall. However, there may be more noticeable effects in population subgroups at higher risk for obesity. Larger increases (such as 18 percent, as was under consideration in New York State in 2009) would have larger effects than any existing differential sales tax. (Sturm et al., 2010) |

**B) 11-15% sales tax (Studies=3):** *Decreases were seen in consumption of SSBs in both simulation and natural experiment studies. Substitutions of non-sugar sweetened beverages was observed (natural experiment).*

| Simulation (Studies=1) | Natural experiment (Studies=2) |
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| ● Price increases were associated with fewer purchases of juice drinks, whereas price increases simulated on both SSBs plus >1% fat and/or high-sugar milk (combined tax) were associated with fewer kilocalories purchased from >1% fat, low-sugar milk, and meat, poultry, fish, and mixed meat dishes. The study provides evidence that a tax on beverages high in sugar and/or fat may be associated with favourable changes in beverage purchases among US households with a preschool child. (Ford et al., 2015) | ● A sustained and progressive impact over time, with a fall in consumption of as much as 16.7% three and half years after its introduction. The effect of the tax on the reduction in purchases became progressively greater across the three and a half years, so the impact of the price rise on consumption is longer term. The study concludes that the observed non-sugar-sweetened beverages (NSSB) substitution effect should be borne in mind when considering the application of this type of tax. (Royo-Bordonada et al., 2022)<br>● Results showed there were no statistically significant changes to unemployment claims in Philadelphia compared to neighbouring counties for supermarkets (ß = -9.45, 95% CI = -98.11, 79.22), soft drink manufacturers (ß = -0.13, 95% CI = -9.13, 8.88), across other potentially affected industries (ß = 9.16, 95% CI = -488.29, 506.60), or across all industries (ß = -445.85, 95% CI = -4272.39, 3380.68) following implementation of the beverage tax. Unemployment declined similarly in Philadelphia compared to surrounding counties. (Lawman et al., 2019) |

**C) 20-30% sales tax / 1.5-2 cents per ounce (Studies=19):** *Reduction was seen in SSB purchases, as well as a decrease in calorie intake from SSBs (simulation and natural experiment). Reduction in weight was demonstrated in adults and children (simulation). There were substitutions demonstrated to other sugar containing foods and beverages (simulation and natural experiment). The tax increases were shown to be passed on to consumers at rates between 48-137% (natural experiments).*

| **Simulation (Studies=13)** | **Natural experiment (Studies=6)** |
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| ● Estimates of an overall purchase decrease 3.4% of beverages. There is also a slight substitution towards higher vegetable purchases of 0.8%. Results by household income suggest that high-income households show larger absolute changes (in liters per household/month) in the purchase quantities of targeted foods and beverages than low-income households. (Caro et al., 2020)<br>● As a result of the tax, per capita consumption of isotonic, regular soft drinks and fruit drinks are reduced by 1.98, 45.03 and 4.06 oz per month, respectively. Most calories were reduced from the consumption of regular soft drinks (512 cal per person per month). Net calories saved are 587 cal per person per month. Average reduction in the body weight as a result is 2.01 lb per person per year. The consumption of isotonics, regular soft drinks and fruit drinks, the set of SSBs, is negatively impacted by the proposed tax, while the consumption of fruit juices, low-fat milk, coffee, and tea is positively affected. (Dharmasena and Capps JR, 2012)<br>● In the case of a 19% VAT reduction on fruits and vegetables (policy 2), high-income households would capture a smaller subsidy transfer (relative to income), than low-income households (0.27% versus 1.69%). "Tax on carbonated SSBs would reduce beverage purchases by a mean (SE) of 4.2 (1.6) and 7.8 (2.8) kcal/d per person, respectively; extending the tax to all SSBs would increase reductions. Estimated mean (SE) weight losses are 0.32 (0.09) kg/y per person. (Finkelstein, 2010)<br>● A decrease in store-bought energy of 24.3 kcal per day per person, which would translate into an average weight loss of 1.6 pounds during | ● 2 years after tax implementation, 137% of the tax was passed through to prices and there was a 42% decline in volume of taxed beverages purchased. Total calories purchased from beverages and high-sugar foods declined, suggesting food substitution did not offset beverage declines. Purchases of taxed beverages declined by 6.1 fl oz (95% CI, −9.9 to −2.4 fl oz; P < .001), corresponding to a 42% decline in Philadelphia compared with Baltimore; there were no significant changes in purchases of nontaxed beverages. (Bleich et al., 2021)<br>● After excluding holiday purchasing, the tax was associated with statistically significant reductions of taxed beverage purchases at 3 and 6 mo (−157.1 ounces, 95% CI:−310.1,−4.1 and−175.1 ounces, 95% CI:−328.0,−22.3, respectively) but not at 12 months. (Lawman et al., 2020)<br>● An increase in sugar from purchases of sweetened foods of about 4.3% following the introduction of the tax in Philadelphia and of 3.7% in the neighbouring localities. While SSB taxes might be effective at lowering consumption of SSBs, substitution patterns may limit the effectiveness of the tax to reduce overall sugar intake. There is an important offset to the 2017 SSB tax in Philadelphia through substitution to sugary food. (Lozano-Rojas and Carlin, 2022)<br>● The estimation of sales and calories sold showed modest substitution to sweets in Seattle following the implementation of its SSB tax. This increase in sweets, measured by both sales and calories, is not likely to offset the potential health benefits of the substantial post-tax decrease in the volume sold from taxed beverages in Seattle. The study does not |

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| the first year and a cumulated weight loss of 2.9 pounds over 10 years. There was no evidence of substitution to sugary foods and show that complementary foods could contribute to decreasing energy purchases. These estimates also suggested the tax would have no effect on total sodium purchased. (Finkelstein et al., 2013).<br>● Price increases were associated with fewer purchases of juice drinks, and with fewer kilocalories purchased from >1% fat, low-sugar milk, and meat, poultry, fish, and mixed meat dishes. (Ford et al., 2015)<br>● Results show that although the magnitudes of the changes in the quality of all diet groups are small, SSB taxes significantly affect the diet quality. The average total HEI changed from 56.21 to 56.30 with a SSB tax. There was no evidence of substitution to sugary foods and show that complementary foods could contribute to decreasing energy purchases. (Gao et al., 2013)<br>● No statistically significant increases were shown in logged volume or dollar sales of snacks or spirits in Philadelphia stores compared to control sites. Supermarket analyses showed substitution to non-taxed beverage concentrates (27% increase in volume, 36% increase relative to other food) but remained a relatively small percentage of overall beverage dollar sales (12% at baseline, 15% at post). At the population level, there is no evidence that Philadelphia's decline in taxed beverage purchases is offset by increases in snacks or spirits purchasing, but there is evidence of substitution to beverage concentrates in supermarkets. (Gibson et al., 2021)<br>● This has a significantly larger impact on nutrition than an equivalent product tax as they are broader based taxes. A 20% SSB tax was demonstrated to reduce total calories purchased by 8.4%. Nutrient taxes are demonstrated to have larger impacts on nutrition than specific product specific taxes. (Harding and Lovenheim, 2017)<br>● HALY gains of 175,300 (95% CI: 68,700; | include individual-level data, consequently it was not possible to examine whether substitutions may differ by race/ethnicity or income. Future research is needed to understand which unintended consequences differentially impact racial/ethnic minorities and lower-income populations. (Oddo et al., 2021)<br>• Sales by local bottlers in Philadelphia fell by roughly 29 percent, while increasing by roughly 26 percent in the region immediately adjacent to Philadelphia, strongly indicating that consumers are traveling outside the city to purchase SBs. Sales declines were largest at supermarkets and retailers, and lower at restaurants and convenience, gas, and drug stores. Finally, same-store sales data for non-beverage products show a remarkable decline of 7 percent, compared to an increase of 1 percent in the region surrounding the city. This is consistent with consumers shifting grocery buying trips outside the city in response to the tax. (Oxford Economics, 2017)<br>● Philadelphia-taxed beverage sales decreased in supermarkets on average by 62% (95% CI=42%, 75%) but did not change in pharmacies. Volume sales of nontaxed beverage concentrates increased on average by 34% (95% CI=19%, 51%), but there was no evidence of substitution to high-calorie foods. Tax pass through was higher in pharmacies (95%) than in supermarkets (48%). Tax pass through in 2018 (68%) was slightly higher than that in 2017 (63%). (Petimar et al., 2022) |

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| 277,800) and healthcare cost savings of AU$1,733 million (m) (95% CI: $650m; $2,744m) over the lifetime of the population, with 49.5% of the total health gains accruing to the 2 lowest quintiles. Additional cost for SSBs would be AU$35.40/capita (0.54% of expenditure on food and non-alcoholic drinks) in the lowest SEIFA quintile, a difference of AU$3.80/capita (0.32%) compared to the highest quintile. Annual tax revenue was estimated at AU$642.9m (95% CI: $348.2m; $1,117.2m). From a 20% tax on SSBs, the most HALYs gained and healthcare costs saved would accrue to the most disadvantaged quintiles in Australia. Whilst those in more disadvantaged areas would pay more SSB tax, the difference between areas is small. The equity of the tax could be further improved if the tax revenue were used to fund initiatives benefiting those with greater disadvantage. (Lal et al., 2017)<br>● Predicted to reduce SSB consumption by 18 % with lower bounds of 6 % and upper bounds of 30%. In terms of SSB kcal/day, the $0.01 tax per ounce is predicted to ultimately reduce SSB consumption by 40.3 (13.4–67.2) kcal/day. The effects are greater for those ages 12–19 years, but less for those ages 6–11 years, a 33.1 kcal/day reduction. (Levy and Friend, 2013)<br>● The simulation shows an average daily reduction of 34–47 calories among adults and 40–51 calories among children. Results demonstrate that the static model significantly overestimates the weight loss from reduced energy intake by 63% in year one, 346% in year five, and 764% in year 10, which leads to unrealistic expectations for obesity intervention strategies. The tax is estimated to generate $5.8 billion a year in revenue and is found to be regressive, although it represents about 1 percent of household food and beverage spending. (Lin et al., 2011)<br>● Increased employment of 4406 jobs in Illinois and 6654 jobs in California, representing a respective 0.06% and 0.03% change in employment. Declines in employment within the beverage industry occurred but were offset by new employment in non-beverage industry and government sectors. The | |

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| estimated increased sales revenue from substitution with non-SSBs to be $81.8 million in Illinois and $318.5 million in California, on the basis of cross-price elasticity estimates, and $365.3 million in Illinois and $613.8 million in California, on the basis of full-volume beverage replacement. Estimates that account only for reductions in SSB demand without accounting for either increased consumption of other goods and services or government spending of new tax revenue. These estimates suggest losses of 7002 jobs in Illinois and 14 992 jobs in California, representing 0.09% and 0.07% of jobs, respectively. (Powell et al., 2014)<br><br>● Predicted to cause an average reduction of 37 calories per day, or 3.8 pounds of body weight over a year, for adults and an average of 43 calories per day, or 4.5 pounds over a year, for children. This reduction in calories would give an estimated decline in adult overweight prevalence (66.9 to 62.4%) and obesity prevalence (33.4 to 30.4%), as well as the child at-risk-for-overweight prevalence (32.3 to 27.0 percent) and the overweight prevalence (16.6 to 13.7 percent). Our results in the present study suggest that the demand for caloric sweetened beverages is own-price elastic, suggesting consumers are relatively responsive to price changes—a 10% price increase is estimated to reduce purchases by 12.6%. (Smith et al., 2012) | |

**D) 38-40% sales tax (Studies=5):** *Reduction in SSB purchases, SSB consumption and calorie intake were demonstrated (simulations). No substitution to sugary foods, complementary food purchases could contribute to decreasing energy purchases (simulations). This SSB tax was found to be regressive (simulation).*

| Simulation (Studies=5) | Natural experiment |
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| ● A 40% SSB tax was shown to be more effective than marketing controls and FOP labeling and yield higher revenues potentially to be used towards public health promotion and investments. The study found own-price elasticities of −1.06 for RTD SSBs, and −1.26 for SSBs from concentrate. This study showed that a tax on SSBs is linked with a much higher reduction in caloric intake as well as significant reductions in added sugar, sodium, and saturated fats. (Caro et al., 2017)<br>● Carbonated SSBs tax would reduce beverage purchases by a mean (SE) of 7.8 (2.8) kcal/d per person; Extending the tax to all SSBs generates mean (SE) reductions. Estimated mean (SE) weight losses from a tax on all SSBs are 0.59 (0.16) kg/y per person; The 40% tax on SSBs, which costs a mean (SE) of $28.48 ($0.87) per household per year, would generate $2.5 billion ($77.5 million) in tax revenue, with the largest share coming from high-income households. (Finkelstein, 2010)<br>● A decrease in store-bought energy of 24.3 kcal per day per person, which would translate into an average weight loss of 1.6 pounds during the first year and a cumulated weight loss of 2.9 pounds over 10 years. There was no evidence of substitution to sugary foods and show that complementary foods could contribute to decreasing energy purchases. These estimates also suggested the tax would have no effect on total sodium purchased (Finkelstein et al., 2013)<br>● Policies directed at SSBs could lead to substantial reductions in calories consumed. A tax increase of $0.02 per ounce is predicted to increase price by 40 % with 100% tax shifting and is predicted to reduce SSB consumption by 36% with lower bounds of 12% and upper bounds of 60%. The effects are greater for those ages 12–19 years, but less for those ages 6–11 years. Under the assumption of | |

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| constant elasticity, the effects increase directly with the size of the tax; kcal/day reductions are half as much with a $0.005 tax/oz. and twice as much with a $0.02 tax/oz. compared to a $0.01 tax/oz. (Levy and Friend, 2013)<br><br>● Results show that a SSB tax would be much more effective in decreasing household nutrients purchase than it would appear by estimating a model neglecting time costs in home food production, due to a lesser compensation of calories from increasing FAH (food at home) consumption. A tax-induced 38% increase in SSB price is predicted to decrease the per capita energy purchase by 41 kcal/day. The effect of an SSB tax would be heterogeneous across income groups (with lower income households that support a higher burden for the tax). Welfare analysis and simple back of the envelope computations suggest that the benefits of the SSB tax would likely overcome the costs at least on average. (Xiang et al., 2020) | |

**E) 50% sales tax (n=2):** *Decrease in consumption, weight and percentage of people with obesity was observed (natural experiment).*

| Simulation | Natural experiment (n=2) |
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| | ● The results demonstrate that state soft drink taxes have a statistically significant impact on behaviour and weight; however, the magnitude of the effect is small. The impact of state soft drink taxes is larger for females, middle aged and older individuals, individuals with greater education, and varies according to race and ethnic categories. These results suggest that soft drink taxes influence behavior but that these behavioral changes are not sizeable enough to lead to large changes in population weight, based on the current magnitudes of state soft drink tax rates. (Fletcher et al., 2010a)<br><br>● Soft drink consumption decreased by 19% among participants. The decrease was 75% greater among obese participants than among lean and normal subjects. After the implementation of the tax, the mean weight was reduced to 84.5 ± 15.3, and the percentage of obese participants decreased by 23%; Weight was significantly associated with soft drink consumption vs. nonconsumption. (Jalloun and Qurban, 2022) |

**F) Other SSB taxation levels or options (Studies=4):** *Taxing sugar content demonstrated prevention of new cases of obesity, reduction in SSBs sold, and decrease in energy density (simulation). Conflicting evidence was provided regarding the efficacy of a calorie or quantity sales tax (simulations). Where import taxes were raised, the prices paid by consumers for SSBs did not increase proportionally to the tax, although sales did decrease.*

| Simulation (Studies=3) | Natural experiment (Studies=1) |
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| **Sugar content levy**<br>● This levy would reduce the energy purchased by both heavy SSB and total calorie purchasers despite their lower price-elasticities. It is estimated to prevent 40 to 78 new cases of obesity in Portugal every year. Estimated a reduction of 6.6million litres of SSBs sold per year. Product reformulation led to a decrease in the average energy density of SSBs by 3.1kcal/100ml. SSB tax would have no effect on total sodium purchased. (Goiana-Da-Silva et al., 2020)<br><br>**Calorie v quantity sales tax**<br>● The consumption and price impacts on output products are higher in the case of a quantity-based tax compared to a calorie-based tax. Based on a joint sweetener tax on a quantity basis, bakery and cereal, and beverage consumption decrease by 34% and21%, respectively. For the same categories, the price increases by 42% and 27%, respectively. For dairy, and other food categories, the consumption increases by 7% and 5%, whereas the price increases by 10% and 17%, respectively. The positive consumption increases in dairy, and other food categories as a result of a joint sweetener tax are because they are substitutes (positive cross-price elasticities) with bakery and cereal, and beverages. (Lakkakula and Schmitz, 2019)<br><br>**Calorie v quantity tax**<br>● A calorie-based beverage tax was estimated to cost $1.40 less in compensating variation than an ounce-based tax per 3,500 beverage calories reduced. If applied to products purchased from all sources, a 0.04-cent per kcal tax on sugar-sweetened beverages is predicted to reduce annual per capita beverage intake by 5,800 kcals. The study found that a calorie based SSB tax would result | **Import tax (raised to 75%)**<br>● The average price of SSBs increased by 26.0% over the two-year study period (Jan-2018 to Jan-2020), while the average price of non-SSB products remained constant. The tax was largely passed through to consumers, but due to its design, price promotions, and consumer responses, the prices paid by consumers for SSBs did not increase proportionally to the tax. A clear consumer response to SSB price changes over time was observed, suggesting a price elasticity in line with those found in other high-income settings as suggested by a meta-analysis (around one). Results indicate SSB sales were down by one quarter (26.0%), compared to where they would have been had prices not increased following the introduction of the tax. Non-SSBs remained just as expensive as the targeted SSB products. The subsidy for the F&V was shown ineffective in this study, as the 5% decrease in tax did not effectively reduce the price of selected F&V included in the subsidy. Further policy measures should increase and expand this subsidy to encourage consumers to buy F&V, for example, by providing healthy food vouchers for low-income consumers. Finally, based on our observation that price promotions on SSBs seriously affected sales of SSBs, we suggest that policy makers keep this in mind when designing future fiscal policies to ensure that price promotions are not allowed on these high-sugar products. (Segal et al., 2022) |

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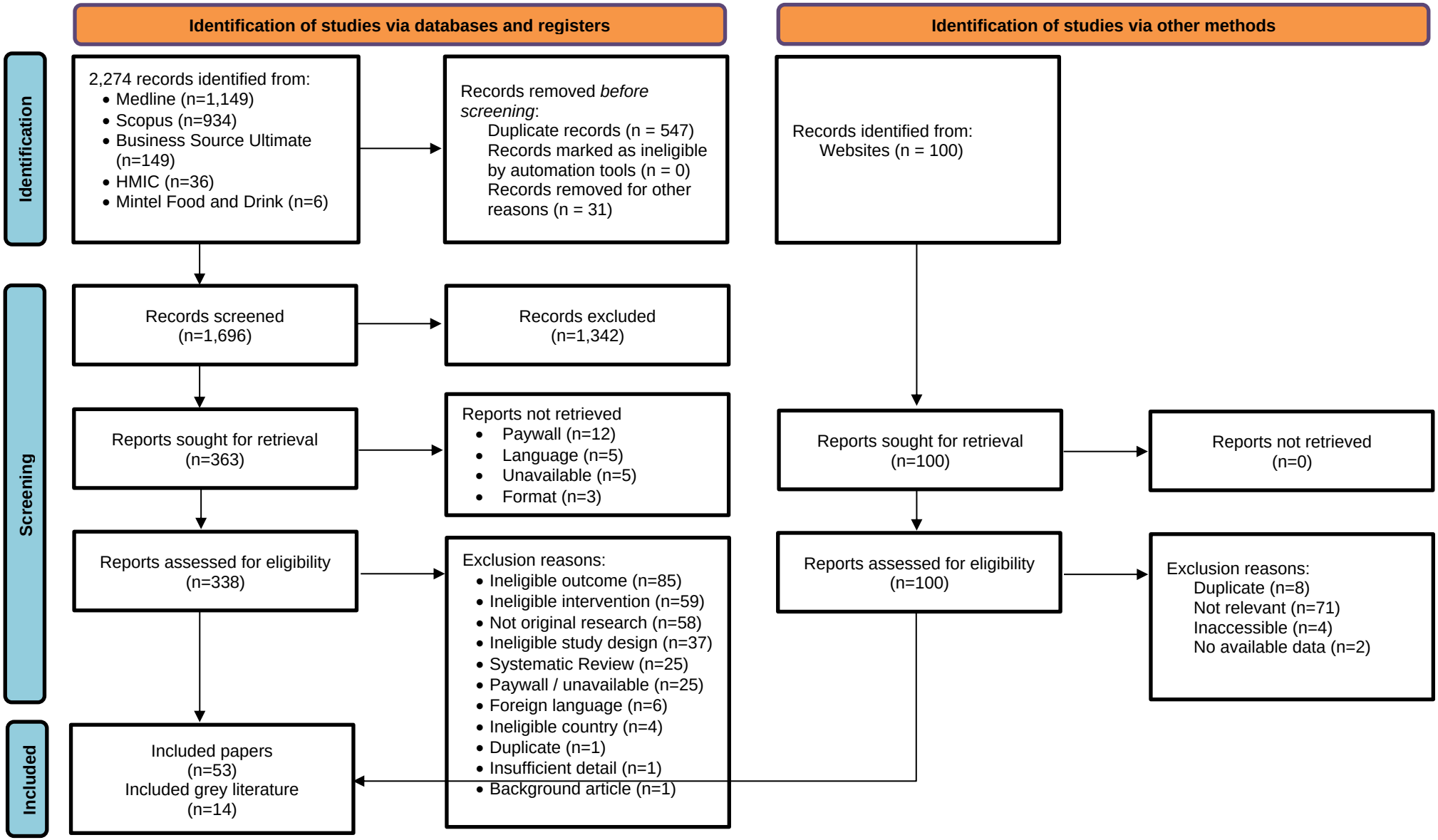
| in smaller increases in prices (7.25%) compared with an ounce-based tax (7.56%). Whereas the models suggest that the calorie-based tax would result in greater reductions in calories (1976-3090 kcal/year) compared with an ounce based tax (1836-3060 kcal/year). A calorie-based tax is more efficient than a ounce-based tax, because it achieves a greater reduction in calories with a lower impact on consumer costs. (Zhen et al., 2014) | |

## APPENDIX 4 - Rapid Review Protocol Inclusion/Exclusion Criteria

| | Inclusion | Exclusion |
|---|---|---|
| Date | • Since 2010 | • Before 2010 |
| Language | • English | • Non-English |
| Location | • High income countries | • Low and middle income countries<br>• Under developed countries |
| Participants | • Human<br>• Adults or children<br>• All genders<br>• All socio-economic backgrounds<br>• All cultures | |
| Intervention | • Effectiveness of any food tax intervention<br>• Effectiveness of any non-alcoholic beverage tax intervention | • Alcohol tax intervention? |
| Outcome | • Any outcome measure – (note whether objective or subjective) | • Opinion piece |
| Setting | • Any setting | • No restrictions |
| Study Design | • Quantitative and qualitative analyses to be included.<br>• Mixed methods<br>• RCT, Non randomised experimental<br>• Case studies<br>• cohort studies,<br>• evaluation research,<br>• observational studies.<br>• Primary Research<br>• Systematic reviews | • No methodological restrictions |

**APPENDIX 5 - PRISMA 2020 flow diagram (Page et al., 2021) for new systematic reviews which included searches of databases, registers and other sources**



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