SUGAR TAX ANALYSIS

VILIFYING SUGAR - WILL IT HAVE A SWEET ENDING?

AN OVERVIEW OF HOW THE SUGAR AND INGREDIENT CONTENT OF SOFT DRINKS HAS CHANGED AND HOW DRINK MANUFACTURERS ARE REFORMULATING THEIR CONSUMER'S FAVOURITE PRODUCTS

FOODMAESTRO

NIELSEN BRANDBANK

INTRODUCTION

The current state of health for the UK population has been referred to as an epidemic with chronic diseases such as heart disease, diabetes, and cancer being accountable for 90% of deaths each year in the UK [1] and rising health care costs associated with the treatment of these diseases. There are several risk factors that contribute to chronic diseases including obesity, physical inactivity, alcohol and tobacco use, and poor diet to name a few. A 2016 England study found 26.2% of adults are obese and a further 35.2% are overweight, meaning 61.4% of adults in England are either overweight or obese [2]. The estimated NHS costs attributed to overweight and obesity health service costs are forecasted to be £8.3 billion in 2025 and increase to £9.7 billion in 2050 [2]. This large economic impact of obesity as well as the social impact that comes with it has initiated a call to action for all stakeholders to strategize and deliver a means to improve health and decrease the obesity prevalence.

Tackling the obesity crisis has been shown to be a complex process considering dietary interventions, physical activity promotion, and encouraging other healthy lifestyle choices. One high-impact solution that the government has recently acted on is the soft drink sugar tax with the aim to de-incentivize the use of excess sugar in drinks and to use the proceeds of the tax revenue to fund childhood obesity prevention programs.

In response to the obesity epidemic call to action and recent implementation of the sugar tax we, at Foodmaestro, have analysed how soft drink manufacturers have responded to the sugar tax announced in March 2016 and then implemented in April 2018.

We analysed 2,268 soft drink products across the past 4 years to understand how a sugar tax could be impacting manufacturer and consumer behaviour changes. We found that the average sugar content of soft drinks has decreased by an average of 1.3 grams per 330ml can from 2014 to 2018 noting that the decrease started pre-sugar tax. Whether the tax itself has accelerated the decrease remains to be seen, but the important measure for now would be the direct impact on consumption and health outcomes. Enforcing a sugar tax to soft drink manufacturers on drinks with over 5 grams of sugar per 100ml doesn't help consumers find healthier drinks but we can see that many manufacturers have reformulated their products, over the past 4 years, to have more products with low to no sugar.

THE PURPOSE OF THIS REPORT WAS TO ANALYSE

the impact of a sugar tax on carbonated beverage formulations from 2014 to 2018 to:

- create a snapshot of how the sugar tax has impacted the drink industry from the announcement to 5 months following the implementation
- identify the use and trends of sugar, artificial sweeteners, and natural sweeteners in the carbonated beverages offered in the markets; and
- understand what the average consumer thinks about the sugar tax to enable future research to monitor consumer insights and overall health impact of the sugar tax.

MARKET VIEW OF SOFT DRINKS IN 2014 VS 2018

2014 (351 products analyzed)	
< 5 grams sugar / 100ml	56%
5 - 8 grams sugar / 100ml	11%
> 8 grams sugar / 100ml	33%

2018 (498 products analyzed)	
< 5 grams sugar / 100ml	70%
5 - 8 grams sugar / 100ml	14%
> 8 grams sugar / 100ml	16%

In the market view of the soft drink comparison from 2014 to 2018, we can see that 70% of products that came on the market in 2018 had less than 5 grams of sugar per 100ml whereas only 56% fell into this sugar content category in 2014. This is a 20% increase of low to no sugar containing soft drinks that came onto the market in 2018 vs 2014. This increase is a combination of existing soft drinks reformulating to lower the amount of sugar, but also introducing more diet or sugar-free soft drinks on the market. Only 16% of soft drinks that came onto the market in 2018 had more than 8 grams of sugar per 100ml. This is a decrease by 106% compared to the portion of high sugar products that came on the market in 2014. To continue to see a trend in the proportion of soft drinks that come on to the market with little to no sugar would be an indicator of success for the sugar tax implementation; but the questions remain as to what is going into these drinks as a substitute for the sugar and what impact will that have on the health of the UK population?

70%

OF PRODUCTS THAT CAME ON THE MARKET IN 2018 HAD LESS THAN 5 GRAMS OF SUGAR PER 100ML

HOW HAS THE AVERAGE SUGAR CONTENT CHANGED OVER THE PAST FOUR YEARS?

5.74 GRAMS / 100ML

2014

6.07 GRAMS / 100ML

2015

5.62 GRAMS / 100ML

2016

5.08 GRAMS / 100ML

2017

4.43 GRAMS / 100ML

2018

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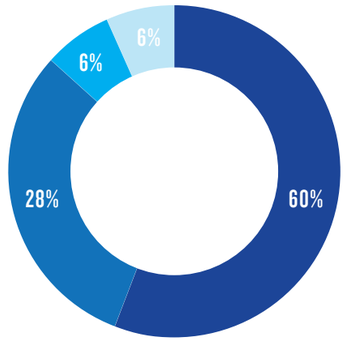
AVERAGE SUGAR CONTENT OF SOFT DRINKS OVER PAST FOUR YEARS

It is encouraging to see the overall decrease in average sugar over the 5 years when comparing all soft drinks including those that contain sugar and do not contain sugar (diet or zero products). To put it in perspective of the 330ml can of soda, this is an average decrease in sugar content from 18.9 grams per can in 2014 to 14.6 grams per can in 2018.

HOW DID ANNOUNCING THE SUGAR TAX IMPACT THE SUGAR CONTENT IN THE SOFT DRINK INDUSTRY?

We analysed 343 soft drink products that existed before and after the sugar tax implementation (April 6, 2018) but had reformulated in some way. The purpose of this analysis was to understand if these products' sugar content increased, decreased, or remained the same and subsequently, if their increase or decrease altered their sugar tax obligation. This ultimately can help us start to understand if the sugar tax triggered a pivotal shift in the use of sugar by soft drink manufacturers. The analysis found that for products that existed before and after the announcement of the sugar tax, 43% decreased their sugar content after it was announced. The average decrease in sugar content was 4.7 g per 100ml. Using the 330ml can of soda example, this is a total reduction of 15.5 grams of sugar per can. Of the products that decreased their sugar content, 67% decreased from 5 grams of sugar or more per 100ml to less than 5 grams of sugar per 100ml indicating that the manufacturer now does not have to pay the sugar tax. A decrease in sugar from these products represents a pivotal shift, and on face value would suggest that the sugar tax has delivered the desired impact, however this can only truly be measured in the coming months when we start to measure the consumer response to the reformulation and if consumers will actually continue to be loyal to the brands with the lower or no sugar or if they switch to the ones with no change. In the meantime, we can begin to analyse what ingredients were added to reformulate drinks to make them have a similar taste yet be able to reduce the sugar content by an average of 15.5 grams per 330ml can of soda.

WHAT INGREDIENENTS HAVE REPLACED THE SUGAR CONTENT?



HOW DID MANUFACTURERS REDUCE SUGAR?

The announcement of the sugar tax, but ahead of the implementation, stimulated many soft drink manufacturers to creatively reformulate their products to decrease the sugar content, while trying to not dramatically change the taste profile. We found that 84% of products were reformulated by adding sweeteners used artificial sweeteners whilst 16% used natural sweeteners.

50% of products were reformulated by adding sucralose, an artificial sweetener commonly known as Splenda. Acesulfame K was added to 28% of reformulated products and aspartame added to 6%, both being artificial sweeteners. Only 16% of reformulated products added steviol glycoside, commonly known as Stevia, which is a natural sweetener.

Sweetener	How much sweeter than regular sucrose?	Acceptable daily intake (mg per kg/day)
Aspartame	200x	40
Acesulfame K	200x	9
Steviol Glycoside	200-300x	4
Sucralose	600-650x	15

It is worth noting how the types of sweeteners used in reformulation have changed since the sugar tax implementation in April 2018. Steviol, a natural sweetener, was added to 23% of reformulated products from April 2018 onwards. This is a 53% increase in products that added steviol glycoside when compared to products before April 2018. This maybe because shoppers have increased knowledge and demand for products with no artificial sweeteners. As this demand increases, it is expected that more diet drinks will use natural sweeteners such as steviol glycoside and market the fact that they don't use any artificial sweeteners.

WHAT ARE THE HEALTH IMPLICATIONS OF THESE DRINK REFORMULATIONS?

Artificial and natural sweeteners are calorie-free food additives that imitate the sweetness of sugar. The evidence regarding the health effects of artificial sweeteners is inconclusive and ongoing. One meta-analysis from 2016 concluded that replacing sugar with sweeteners might be helpful in reducing energy intake and body weight in both children and adults [5].

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For people living with diabetes, research suggests that artificial sweeteners are safe when consumed below the adequate daily intake (ADI). That being said, artificial sweeteners should be consumed below the ADI for all populations. As explained by the British Dietetic Association, a typical can of a diet soda contains 180mg of aspartame.

The ADI for aspartame is 40 mg/kg body weight/ day. For a 70 kg adult, this equates to a maximum of 2800 mg of aspartame per day which would mean that adult would need to consume 15 cans of the diet soda in one day to exceed the daily limit for that day [6].

However, recent evidence could suggest that consumption of one artificial sweetener may increase a risk factor for type 2 diabetes. Sucralose, commonly known as Splenda, has new evidence to suggest that it may have a negative effect on insulin sensitivity [7]. One randomized control trial, published in September 2018, studied the effect of consuming 15% of the ADI for 14 days. This is the amount in less than three 330 ml cans of soda made with sucralose for a 70 kg adult. The study showed that those who consumed sucralose for 14 days had a significant decrease in insulin sensitivity compared to the control group [7]. Somebody with a low insulin sensitivity requires more of the insulin hormone to lower blood sugar levels in the body and could lead to insulin resistance. Insulin resistance is a key risk factor for the development of type 2 diabetes.

Therefore, while reducing sugar consumption has benefits to lowering energy intake and could therefore have an impact on weight management, the health effects of sweeteners that are being used to maintain the sweet taste are still being studied and understood.

WILL IMPLEMENTING THE SUGAR TAX HAVE A POSITIVE IMPACT ON HEALTH OUTCOMES?

Following the sugar tax announcement, our analysis found that 43% of the 343 soft drink products that changed formulas before and after the sugar tax announcement decreased their sugar content by an average of 15.5 grams of sugar per 330ml can. While this sounds like a significant reduction, it is important to consider who this will have the largest health impact on. For the shopper who has a can of soda twice a month as a "treat", this reduction is unlikely to have any impact on health. In 2016, the average UK consumption of soft drinks was 206.2 litres per person per year or 56 ml per day. With this logic and the average sugar reduction of 15.5 grams per 330ml can, the average UK soda consumer is having 2.6 grams of sugar less each day. However, for the consumer who drinks 2-4 cans of soft drinks everyday, this will likely significantly reduce obesity, chronic disease risk, and prevalence of dental caries as it is an average decrease of 31-62 grams of sugar each day.

As evident by the average decrease in sugar content, in combination with evidence of sweeteners to replace sugar being added having 200-650 times the sweetness of the sugar it's replacing, the question remains if shoppers are actually training their taste buds to not crave the same level of sweetness or if their sweet tooth remains.

> "WILL MOST SHOPPERS THINK ABOUT THE SUGAR TAX EVERY TIME THEY REACH FOR A CAN OF SODA? LIKELY NOT. BUT IF THE SUGAR TAX OR FUTURE INGREDIENT-BASED TAXES RAISE GOVERNMENT FUNDING FOR HEALTH PREVENTION PROGRAMS AND INFLUENCE FOOD MANUFACTURERS TO TAKE A SECOND LOOK AT THE HEALTH IMPACT OF THEIR RECIPES, I THINK IT IS A STEP IN THE RIGHT DIRECTION."
>
> JULIA HAYDEN, REGISTERED DIETITIAN, FOODMAESTRO

If it is suggested that the announcement and implementation of the sugar tax has resulted in both large and small manufacturers to decrease the sugar content of products, it is natural to wonder if we will continue to vilify and tax ingredients that have enough evidence to prove a negative effect on health? It would be beneficial to have a clear understanding from health officials of what is enough evidence to make the decision to implement a tax. As with all nutrition research, it is difficult to be able to see a correlation between reducing a specified "bad ingredient" and changes in rates of onset or complications of chronic diseases as there are so many other lifestyle factors that can affect chronic diseases. Moving forward it will be important to consider what has the bigger health impact: consuming 2.6 grams less of sugar each day or improving other healthy behaviours such as diet, physical activity, stress management and sleeping patterns.

ARE SHOPPERS AWARE OF THE SUGAR TAX AND MORE IMPORTANTLY: DO THEY CARE?

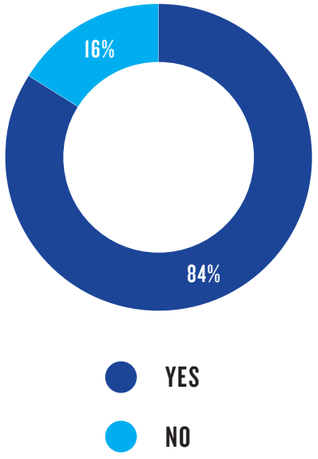
June 2018 shopper insight data from Nielsen Brandbank has found that 92% of shoppers are aware of the sugar tax.

42% of shoppers agree with the sugar tax as a way to fight obesity. In other words, less than half of shoppers can see the correlation with vilifying sugar and directly connecting to the obesity crisis.

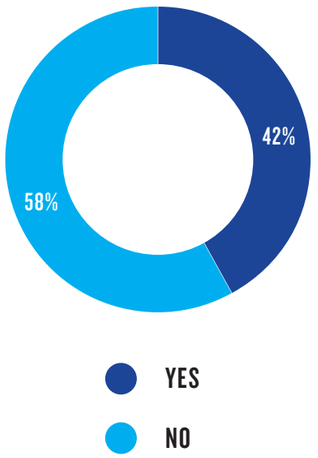
DID YOU KNOW, 1 IN 5

SHOPPERS CHECK SUGAR CONTENT ON PACKAGES MORE FREQUENTLY SINCE THE SUGAR TAX WAS IMPLEMENTED?

SHOPPERS: ARE YOU AWARE OF THE SUGAR TAX?



SHOPPERS: DO YOU AGREE WITH SUGAR TAX AS A WAY TO FIGHT OBESITY?



69% believe the sugar tax should be expanded to include sugared confectionery and cookies. This is interesting because it may show that shoppers are making a connection between the sugar tax and lowering the amount of sugars in their foods. Therefore, shoppers are seemingly expecting an ingredient-based tax to result in a decrease or substitute for this ingredient.

62% of shoppers claim they have not changed their consumption behaviour in any way post sugar tax. This sounds high however, when positioned as 38% of shoppers claim that they have changed their consumption behaviour, this should be seen as a positive impact.

As well, while the 62% of shoppers say they have not changed their consumption, they could very well be consuming one of the 43% of products that decreased their sugar content.

> **"ALTHOUGH THE MAJORITY OF CUSTOMERS HAVEN'T CHANGED THEIR HABITS, THE REACTION FROM THE INDUSTRY WILL SATISFY ANYONE WHO HOPED THE SUGAR TAX WOULD HELP TO REDUCE SUGAR CONSUMPTION."**
> JAMES PORTER, SUBJECT MATTER EXPERT, NIELSEN BRANDBANK

It does raise the question of whether we should continue to tax products with "bad ingredients" or rather, continue to make shoppers aware of the health impact of their most consumed foods and continue to increase product transparency. Wouldn't it be great if health care professionals, policy makers, and shoppers alike on the same mission to improve health and prevent chronic disease had the knowledge of what packaged foods contained and how these formulations change over the years? The hierarchy of the government-health care practitioner- patient relationship needs to start to transform into a team network and continue to monitor manufacturer trends with unbiased, manufacturer data such as what Foodmaestro and Nielsen Brandbank can present.

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IN CONCLUSION

With the sugar tax implementation being in effect for only 6 months thus far, there is still much analysis to be continued on shopper perception of the sugar tax impact as well as how drink (and possibly food manufacturers) adjust their formulations to better meet the demand from shoppers, health care practitioners, and health policy makers. It is expected from the results seen so far with this nutrient-tax, that manufacturers react to policy makers vilifying and taxing a specific nutrient. Manufacturers are put in a position to consider reformulation based on nutrient-based taxes while also considering how to keep their consumers' taste buds happy with the reformulated products. Artificial ingredients may help to maintain the taste profile of a product when pressured to remove certain ingredients, however if the overarching goal is to improve health outcomes, then more knowledge of long-term health effects of these substitute ingredients is warranted.

The sugar tax is a learning process for all stakeholders. It will be vital to continuously monitor reformulation changes to existing products and the ingredients most used in new products that come onto the market. Foodmaestro aims to unlock this knowledge to inform health care professional and policy maker opinions on the effectiveness of the sugar tax.

References:

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[3] https://www.bda.uk.com/improvinghealth/healthprofessionals/policy_statements/sweetners

[4] https://ec.europa.eu/jrc/en/health-knowledge-gateway/promotion-prevention/nutrition/sugars-sweeteners#_Tocch5

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