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Sugar taxation: a good place to start but not the place to finish

The 21st century is presenting a fascinating chapter for the already-extensive social history of sugar, around taxation specifically of sugar-sweetened beverages.

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In April 2018, the UK introduced a levy on sugar-sweetened beverages (SSBs), with two bands of taxation: beverages containing 5g-8g of added sugar per 100ml are taxed at 18p per litre, and those with 8g or more, 24p per litre (1). Of course, familiar loud voices oppose taxation, supporting the principle of market freedom and dismissing the public health arguments that taxation will reduce SSBs consumption thereby opposing obesity and related chronic diseases and raising valuable revenue to amplify public health gains (2). Taxation changes behaviours, and has effectively reduced harms from tobacco and alcohol, although their continued excessive consumption among more deprived communities is worrying (3). Reassuringly, Redondo et al (2018) find SSB taxation is effective among people from poorer socioeconomic circumstances and without a damaging tax burden (4).

The systematic review by Redondo and colleagues (2018) lays to rest one notion, that people will simply absorb a tax and continue as before: if a tax is at least 8%, people will buy and consume less SSBs, at least for a period. The new UK levy adds about 10%, so consumption will probably fall. But Redondo et al (2018) conclude that increasing by over 20% may be necessary to reduce SSB and total caloric intake, particularly in deprived obesity-prone communities (4). But will such taxes improve public health or generate valuable revenue?

SSBs are widely consumed, totally discretionary, products, so appropriate targets for taxation. For effective revenue-raising, sales should be maintained or tax increased. The initial estimate for UK’s SSB tax was £500m per year, but that has already been reduced drastically because the manufacturers rapidly reformulated their products, adding artificial sweeteners to avoid exceeding the tax thresholds (5).

Historically, sugar has generated vehement opposition since its arrival into Europe in the 16th century. Sugar upset the aristocracy, land-owners and church by providing sweetness without having to contend with the vagaries of bees, and as a new easy source of alcohol. Sugar was taxed initially as a Molasses Tax from 1733. The purpose to raise revenue was also an effort to curb the enormous
wealth of colonial (including American) sugar producers. Slavery and rum manufacture were also factors considered to justify the Sugar Tax (6). It was repealed in 1766 but played a key role behind the alienation of the American colonies and their Declaration of Independence.

Sugar has been raised as a cause of a huge range of diseases. A vast body of modern research has concluded that while sugar is associated with several conditions, its role in their causation remains confounded, with the possible exception of dental caries. Of course, extreme high-sugar diets displace more nutritious foods and deplete essential micronutrients (7, 8). When the city of Glasgow expanded from a small regional town to become the second city of the empire in the 19th century, there was no food provision service, and the population demand was met with a stereotypic imported diet of white bread, jam and sugary tea, which persisted through habit and regional poverty as ship-building declined, well into the 20th century. Its upshot was widespread stunting, and a dramatic rise in heart disease in Scotland, compared to England, which even now appears to relate in part to lower fruit and vegetable consumption (9).

Meta-analyses show that sugar consumption does promote weight gain in children (OR 1.55) and adults (0.75-1.19 kg), and that may contribute to increased risk of type 2 diabetes (10, 11). However, this is not a unique metabolic effect of sugar as isocaloric replacement of sugar with other macronutrients produces similar consequences (10).

Evidence appears adequate to support targeting of SSBs, but doubt remains whether such taxes alone will impact obesity or other health outcomes, which would demand a sustained effect? The likely effects can be gauged by modelling using current consumption data. Figure 1 assesses the best-case scenario, applying the reported impact from 12 months of the Mexican SSB taxes (12) to the UK group with highest SSB consumption (11-18y olds) (13). The very small reduction in sugar intakes, if maintained over a number of years could in principle result in reduced weight gain. However, that would only occur if there is no compensatory increase in other sources of calories. It is a depressing reality from most research on free-living individuals that weight-loss achieved is
below what should occur with full adherence to diet prescriptions: human appetite is good at compensation. Early signs suggest that consumers in Mexico replace SSBs with water (14), which may reduce appetite for sweet snacks (15). However, artificially-sweetened beverages are cheaper to produce, and their market share already increasing. People accustomed to drinking 10% sugar solutions may prefer a shift to artificially sweetened alternatives, which may potentially maintain their appetites for sweet high-calorie snacks (16).

To conclude, it seems likely taxation will achieve reduction in SSB consumption, but the current SSBs taxation regimes in Mexico and UK are unlikely to produce the reduction required to have a major or sustained effect on obesity. It is critically important that governments have agreed with public health advocates that damage from excessive consumption of unhealthy food and beverages represents unacceptable externality from the free market: government intervention is necessary in the same way as to protect the public against environmental and water pollution. To be more effective, taxation may need to be increased substantially for SSBs as suggested by Redondo and colleagues (2018), widened to other sugar-containing products or even directed at other obesogenic product-classes such as intensively marketed high-fat sweetened snacks (17). Serious efforts for health promotion might go on to ban undesirable foods and beverages in vending machines. Other measures might address caffeine, which increases SSB consumption addictively (18). No single policy or program will sufficiently impact the complex problem of obesity. Lessons from other complicated public health problems such as road safety, alcohol and drug use, show that a sustained, comprehensive portfolio of complementary strategies, delivered at scale, will be required. A tax on SSB is a good start, but not the place to stop.
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**Figure 1.** Projected maximal impact on energy balance and body weights from a 6% reduction in consumption of sugar sweetened beverages, as reported in Mexico one year after introduction of taxation. This example illustrates the impact among UK children, the highest consumers of SSBs. The effect among adults is slightly smaller. This projection assumes that there is no compensatory change in caloric intakes if sugar in SSBs is removed from children’s diets, and does not account for any changes which might be made by the food industry to incorporate the removed sugar into other products.