WN *Update*

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Editor's note

In this *Update*, the contributions are mostly about sugar. For a long time it has been agreed by leading experts that sugars and syrups, as contained in industrialised food supplies, cause tooth decay and (as sources of calories) overweight and obesity. The opinion that they directly cause obesity, and also diabetes, or heart disease, or the metabolic syndrome, has been held only by a small number of qualified scientists. But late last year three sources, taken together, suggest that the tide may now be turning against sugar. One, from *PLoS Medicine*, is a usual expert source. Two, from the *Wall Street Journal* and the global investment bank Credit Suisse, will have leverage with policy-makers, because publications like these influence government and industry, and move the money markets.

Big Food Watch. Sugars. Obesity, diabetes, metabolic syndrome

The walls are tumbling down – *Credit Suisse*



BIG FOOD WATCH

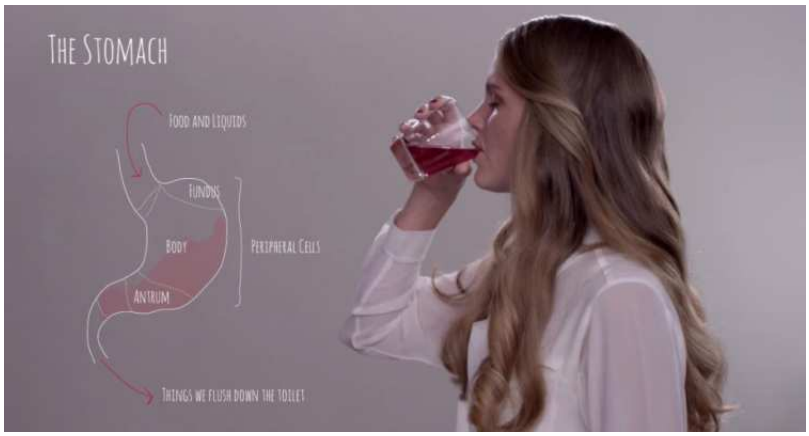
Access September 2013 Credit Suisse report Sugar at a Crossroads here



It is time to tax sugar, concludes a Credit Suisse Wall Street bank report. Some of its evidence is from (left to right) George Bray, Barry Popkin, David Ludwig, and economist Frank Chaloupka

The Big Food Watch team reports:

'Incredible presentation from Wall Street bank shows how sugar is destroying the world' (1). 'Sugar linked to $ 1 trillion in US healthcare spending' (2). These were two excited headlines of features published in October in *Business Insider* and in *Forbes*, leading US business and finance journals.



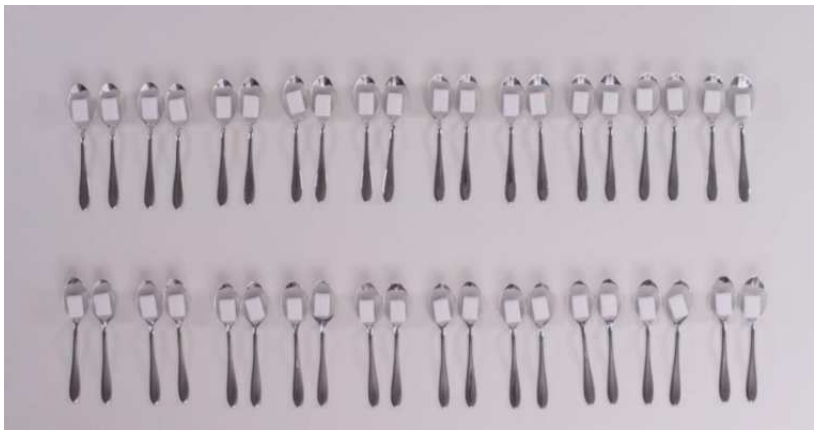
This is one of the elegant graphics from the Credit Suisse video. It illustrates the point that sugar as contained in soft drinks does not satisfy appetite and if only for this reason is liable to cause obesity

They were commenting on *Sugar. Consumption at a Crossroads* (3), published by Credit Suisse, the investment bank based in Zurich, which is a Wall Street heavy hitter. This report is accompanied by a short hard-hitting video, available here as summarised in print (1), *or from YouTube* (4).

The Credit Suisse team was led by its head of research for private banking and wealth management. The purpose of the report is to advise its corporate and private investors where to put their money. The report is carefully written and elegantly presented. Its conclusions are derived from referenced studies and the team's own research. Some studies cited indicate or conclude that sugars and syrups in amounts now typically present in industrialised food supplies, are a direct cause of obesity (hard to treat unless with drugs or surgery), of 'type 2' diabetes (debilitating, expensive to treat, and eventually quite often deadly), or of the multi-organ metabolic syndrome. Other studies cited propose taxation on sugars and syrups in general, or on specified sugared ultra-processed food and drink products, or specifically on sugary or syrupy soft drinks, which supply 43 per cent of all sugars intake in the US.

The verdict is 'guilty as charged'

Authors of these studies include (from left to right above), US obesity authorities George Bray, Barry Popkin and David Ludwig, and lawyer Frank Chaloupka, and many others including Walter Willett, Kelly Brownell, Thomas Friedan, and Robert Lustig. Most evidence and facts in the Credit Suisse report are not new. What the researchers have done is make their judgments themselves, rather than follow scientists, who characteristically are cautious, and often rely on evidence of types that are difficult to obtain. Instead, they have built up a circumstantial case, using different types of evidence, as is done in a court of law when somebody is indicted and eventually judged to be innocent, or else guilty beyond reasonable doubt. The verdict of the Credit Suisse team on sugars, obesity and diabetes, is in effect, 'guilty'. Also, 'there is not a single study showing that added sugar is good for you'.



Another graphic from the Credit Suisse video. This illustrates average US added sugar intake as being equivalent to 40 teaspoons a day. World average is 17, US guideline advice is 6 to 9 a day!

The idea that sugars and syrups in the amounts now contained in food and drink products are the main cause of obesity, diabetes, or the metabolic syndrome, probably remains a minority view among qualified nutrition professionals. With nutrition and chronic diseases there are few clear-cut diagnoses. But the opinion of many scientists in the field now is that sugars in the sense indicated above are an independent and important cause at least of obesity and diabetes. Some feel that studies of the type currently accepted as producing strong evidence are failing to take obvious realities and the current global crisis of obesity and diabetes into account.

The fat and sugar see-saw

A point often made by scientists who are also activists, such as Walter Willett of the Harvard School of Public Health, is that between the 1960s and 1980s consumption of dietary fat dropped in the US, but rates of obesity increased, and as from the 1980s began to rocket. In this period, in response to urgent warnings from government and expert sources, manufacturers reduced the amount of fat in their ultra-processed products, but reformulated them so that they contained more sugars and syrups – often, a lot more. Now, very many processed products in supermarkets contain added sugars or syrups. In the same period, production and consumption of sugared or syruped soft drinks or 'soda' have sharply increased. The cost to health services of type 2 diabetes worldwide is now estimated at $US 470 billion, projected to rise to $US 700 billion by 2020.

Current world average consumption of added sugars and syrups amounts to the equivalent of 17 teaspoons a day, almost double what it was 30 years ago. The figure now for the US, as shown graphically above, is 40 teaspoons a day. The American Heart Association recommendation now, is the equivalent of a maximum of 6 teaspoons a day for women and 9 for men! It seems obvious that education and information campaigns alone will not do much to narrow such a wide gap. What is evident is a market failure of a type that can only be addressed by legislation.

The Credit Suisse report concludes that the case is made for taxation in some form. The report also anticipates, again on an analogy with tobacco, the need for warning labels on food and drink products that contain a lot of sugars or syrups. The resulting drop in consumption would lower the costs of health care, and the revenue from the taxes could go to fund public health initiatives with serious money.

The Credit Suisse team conducted its own survey of general practitioners in the US, Europe and Asia, asking whether they saw causal links between consumption of added sugars and syrups, and obesity, type 2 diabetes, and the metabolic syndrome. General practitioners are less cautious than nutrition scientists. 'Close to 90% of participants support these conclusions'. At the grass roots, the medical profession has already made up its mind.

Is Big Sugar now a busted flush?

Big Sugar is made up from the manufacturers whose profits derive from sugary products, the sugar producers and refiners, and their representative and associated organisations. In the US these include, for example, the Corn Refiners Association, the International Dairy Foods Association, the National Corn Growers Association, the Snack Foods Association and the Wheat Foods Association, as well as the Sugar Association. Big Sugar has for over half a century built what has seemed to be an impregnable fortress in defence of sugars as a harmless and enjoyable source of energy. As stated by the US Sugar Association Inc in 2003 (5): 'SAI is committed to the protection and promotion of sucrose consumption. Any disparagement of sugar will be met with forceful, strategic public comments and the supporting science'. But now the walls of the sugar fortress are cracking and may tumble down.

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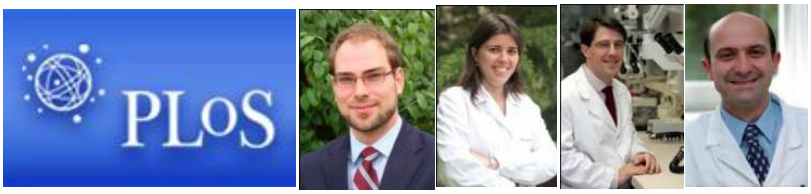
Big Food Watch. Big Sugar. Conflicts of interest

Sugar-funded research sees sweet nothings – *PLoS Medicine*

BIG FOOD WATCH

Access December 2013 PLoS Medicine on conflicts of interest here



It is time to discount research on sugar funded by industry. Left to right, PLoS Medicine editor David Stuckler, authors Maira Bes-Rastrollo, Miguel Ruis-Canela, Miguel Martinez-Gonzalez

The Big Food Watch team reports:

Big Sugar front and support organisations have for half a century systematically funded many researchers whose investigations relate to sugars and health. The findings of such research, whether on tooth decay, obesity, diabetes, or heart disease, or on other disorders and diseases, are often helpful to the sugar industry.

PLoS Medicine editor David Stuckler (left, above) has guided an investigation by a group of Spanish authors (above) with a German colleague (1). This is a systematic review of systematic reviews on the relationship between consumption of sugared soft drinks, and weight gain. A total of 17 reviews were examined, of which 6 were funded by conflicted sources – Big Sugar, the sugar and associated industries. Of these, 5 found no association. A total of 11, one of which had 2 conclusions, received no conflicted funding. Of their 12 conclusions, 10 found an association.

The authors conclude: 'Scientific endeavor should seek the truth, irrespective of financial or other interests. If other concerns influence the results of research, nutrition science as a whole is likely to suffer, partly because of incorrect information, and partly through a loss of confidence in the discipline from the general public. Eventually, nutrition research itself might be at risk because perceived biases would threaten to make it irrelevant. The influence of biased reviews on policy makers and medical practitioners might also be another potential threat for public health. Furthermore. …the potential misleading role of the food industry on health issues is greater in developing countries than in developed ones… The scientific community should make special efforts to preclude funding by parties with vested interests at all levels, to sustain the credibility of nutritional science'.

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Big Food Watch. Sugars. Dietary guidelines

Top limit for added sugars to be halved – says *who*?





It is time to cut the upper limit for added sugars, say expert WHO advisors. Or so say the media… Left to right, the experts include Duo Li, Paula Moynihan, Jim Mann, and Shiriki Kumanyika

The Big Food Watch team reports:

Reports in UK newspapers *The Guardian* (1), the *Daily Mail* (2), *The Sunday Times* (3) and also *The Times* and other newspapers, some syndicated around the world, state that a WHO expert advisory group is proposing to reduce the upper limit for added sugars, previously set by WHO a decade ago at less than 10 per cent of total energy intake (4) to 5 per cent, which can also expressed as roughly 5 teaspoons.

The scientists responsible are members of or advisors to the WHO advisory NUGAG group. They include (left to right above) Duo Li (China), Paula Moynihan (UK), Jim Mann (New Zealand), and Shiriki Kumanyika (US). Others include Ibrahim Elmadfa (Germany), Carlos Monteiro (Brazil), Este Vorster (South Africa), and John Cummings (Scotland). The group's secretariat is supplied by WHO.

The Sunday Times speculated that: 'Publication of the recommended new limit had been delayed, amid fears of a robust response from the multi-billion-pound food industry' (3). Big Sugar, representing transnational manufacturers, sugar producers

and refiners, and associated bodies, did indeed vehemently object to the recommendation of less than 10 per cent published by WHO in 1990 (5) as well as in 2003 (4). One confectionery bar, or one helping of sugared breakfast cereal, or one can of sugared soft drink, each contain the equivalent of around 5 teaspoons of added sugars or syrups. A target of 5 per cent implies that consumption of most ultra-processed food or drink products, high in added sugars or syrups, would be occasional, not regular – good for health but not for profits.

Media attention in December was sparked in part by publication of a systematic review of studies on sugar and dental caries commissioned by WHO and carried out by Paula Moynihan's group at Newcastle University (6). It concludes that further protection against dental caries, a critical public health issue especially in lower-income countries and settings, is given by intakes lower than 10 per cent, down to 5 per cent. A review of studies on the impact of added sugars and syrups on weight gain, also commissioned by WHO, carried out by Jim Mann's group at the University of Otago (7) and published a year ago, shows a protective effect of low intakes.

The public health duty

The members of the NUGAG group, whose deliberations on added sugars are not complete, are charged to respond effectively to what is now an uncontrolled global epidemic of obesity and also of diabetes, at levels far worse than ten years ago, with appalling rates of increase in the global South. Their recommendations will be crucial in guiding governments especially of lower-income countries, where the cost of treatment is beyond the reach of any but fully insured upper middle class people.

For most – maybe all – countries, the only rational and feasible approach is prevention. What is for sure, is that there is no need for added sugars and syrups, which contribute calories and no nutrients, and also that no harm can come from reducing their consumption. The obvious and rational action is to cut right back on added sugars and syrups, most of all from soft drinks. The best decision on sugars and syrups designed to protect public health worldwide should be based on sound and consistent evidence of all relevant types, guided by the deep knowledge and experience of the members of the NUGAG group, and also by wisdom, common sense and concern for world health – which is what WHO stands for.

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Big Food Watch. Legislation to promote healthy food
Latin America leads the way – *Wall Street Journal*



BIG FOOD WATCH

Access November 2011 home page news on Valparaiso summit here
Access July 2012 PLoS Medicine Carlos Monteiro et al on Big Food here
Access July 2012 Enrique Jacoby on Peruvian food systems here
Access November 2012 Enrique Jacoby et al on Latin American food law here
Access June 2013 Update on Mexican tax on ultra-processed products here
Access December 2013 Update on Mexican tax on ultra-processed products here



It is time to legislate to protect healthy food in Latin America. Left to right: WSJ; Enrique Jacoby (Peru and PAHO), Guido Girardi and Ricardo Uauy (Chile); but Woods Staton (McDonald's)

The Big Food Watch team reports

Latin America as a whole continent is leading the charge to protect healthy food systems and dietary patterns, and to restrict ultra-processed food and drink products. That is the message of a news feature published in the US finance daily paper the *Wall Street Journal* on 28 December, syndicated in newspapers throughout Latin

America. (1). Latin American public health nutritionists are in the forefront of this movement. They include Enrique Jacoby, a Peruvian who works for the Pan American Health Organization, a regular contributor to *WN* (second from left, above) (2, 3). They also include Ricardo Uauy, a Chilean and a former president of the International Union of Nutritional Sciences (third from left above, on the right-hand side, with Chilean senator Guido Girardi)

Wall Street Journal reporter Amy Guthrie writes: 'Latin America is becoming a laboratory for public policies meant to steer consumers away from processed food', instancing the Mexican tax on ultra-processed food and drink products, planned to come into effect soon (4,5). 'Since 2012, Peru, Uruguay and Costa Rica have banned junk food from public schools. Ecuador recently mandated a nutritional label system inspired by a traffic light… Industrial food makers in Ecuador will also be barred from using images of animal characters, cartoon personalities or celebrities to promote products high in salt, sugar or fat'.

Why Latin America? The *WSJ* sees a political reason. 'Because many governments in Latin America lean to the left, and don't always have the best relationships with corporations, the incentives to eat healthier just might stick – and then spread to other parts of the world'. The mood in the continent may now be changing. Enrique Jacoby, who knows Latin America well (3,5) says 'Mexico and Chile bought into the idea of modernity being junk food and Coca-Cola. Now they're paying for that'.

The rates of obesity especially among children in these countries are so high, and the causal link with ultra-processed food products and sugared soft drinks so obvious, that other Latin American countries are seeing Mexico and Chile as awful warnings. The agreed taxes in Mexico are a start in the right direction. So, it is believed, is the re-election of Micheline Bachelet, qualified as a public health physician, as the next president of Chile. Senator Guido Girardi is proposing that she follows the example of the Mexican president in supporting taxes on unhealthy food and drink products.

The Valparaiso summit

For many public health and nutrition scientists and activists in Latin America, the movement summarised in the *Wall Street Journal* was launched at a summit meeting held in the Chilean national senate building in October 2011 (6). This was the first meeting at such a high level following the summit on the prevention and control of chronic non-communicable diseases held at UN headquarters in New York that September.

Guido Girardi, then senate president, was the host, with Ricardo Uauy as the leading advisor. Guests and speakers came from 12 countries in the Americas outside Chile. Speakers included Enrique Jacoby; Pekka Puska, director of the national institute for public health, Finland; Juan Rivera, head of nutrition at the national school of public health, Mexico; Philip James, president of the International Association for the Study

of Obesity, London, and *WN* columnist; Geoffrey Cannon, fellow *WN* columnist; paediatrician and campaigner against added sugar Robert Lustig; Carlos Monteiro, professor of public health nutrition at the University of São Paulo, Brazil; and Peruvian writer, consumer champion and congressman Jaime Delgado.

The conference was packed with around 1,500 people present. Industry executives were also invited to speak. They included Woods Staton (right in the row of pictures above), boss of the biggest McDonald's system of franchises in Latin America, who arrived in his own plane. He caused merriment by saying 'I am representing an enterprise that does not produce processed food' and that McDonald's is 'not a fast food enterprise'. In contrast was Jaime Delgado. Quoted in the *WSJ* he said: 'We have to safeguard our ancestral culinary traditions… Why have we allowed the rules to be set by the companies? This stuff is ultra-processed. It's not even food'.

The secret of success

Campaigns succeed when they engage like-minded people from all relevant areas, which in the case of public health nutrition include strong-minded, outspoken and courageous leaders. These need to come from UN agencies, national governments, civil society organisations, health professional organisations, and also include food writers, and representatives of the interests of rural and urban workers, and of women and children, all working together with a common purpose. Necessary for success are also journalists whose news and features get prominent coverage in influential electronic, broadcast and print media. And when leading financial newspapers like the *Wall Street Journal* take notice, the markets may move.

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Sugars. Obesity, heart disease – and toxicity, addiction
Advocates are on the move

Access May 2004 Public Health Nutrition Geoffrey Cannon on Big Sugar here
Access Nature February 2012 Robert Lustig et al on sugar as toxic here
Access March 2012 NYT Michael Mudd on Big Food here
Access PLoS One February 2013 Sanjay Basu et al on sugar and diabetes here



Six of the scientists, writers and activists, writers on the trail of Big Sugar and Big Soda. From left, Robert Lustig, Michael Moss, Alex Renton, Charlie Powell, Mike and Karen Small of Fife Diet

Isabela Sattamini reports:

Sugars and syrups are added to a vast variety of ultra-processed products. Sugar now is much attacked by health professionals. Thus: 'Sugar is the most dangerous drug of this time... As with smoking, soft drinks and sweet products should come with the warning that sugar is addictive and bad for the health' (1). This is the view of Amsterdam public health chief Paul van der Velpen. On addiction, he was doubtless referring to a large body of research on humans as well as animals, some referenced in previous issues of *WN* (see links above, the *Update* below this one, and 2-4).

An increasing number of qualified researchers now believe that sugars and syrups, in the quantities typically present in industrialised food supplies, are a direct cause of obesity, and also of diabetes. This is shown by other contributions to *Update* in this issue of *WN*. But a growing number of scientists, writers and public health advocates and activists, go much further. They see added sugars as a cause of the multi-organ disease known as the metabolic syndrome. They also see added sugars and syrups, consumed regularly in ultra-processed food and drink products as they are now in industrialised countries and settings, as toxic and potentially addictive.

Is the tide turning?

This is the view of Robert Lustig (above, left), a paediatrician from the University of California at San Francisco specialising in endocrinology. Following the book *Good Calories, Bad Calories* (5) by science writer Gary Taubes, whose fierce views are similar, Robert Lustig's 90 minute long YouTube lecture, 'Sugar: the Bitter Truth' (6) had by late December been accessed over 4 million times. His book *Fat Chance* (7) is now a best-seller. He believes, contrary to the long-established scientific consensus (8), that added sugars – including high-fructose corn syrup – in the amounts now consumed in industrialised countries, are more of a menace than saturated fats.

These strong views are now resonating with the public and also with agenda-setters and policy-makers in government, civil society and the media. Three reasons are:

- Energetic and networked advocacy. Scientists and others who have gone public are making their views heard over a full spectrum of media outlets, and are gaining support from public interest organisations.
- Explosive implications. Their claim that sugared ultra-processed products including soft drinks are addictive, if upheld in legal proceedings, would put Big Food in the same position of disgrace as Big Tobacco.
- Insider verification. As revealed by Michael Moss (second from left, above) in his 2013 book (9), *Big Food executives have known for many years* that their ultra-processed products cause obesity and that some are addictive (10).

In 2012 *Robert Lustig and colleagues stated in Nature:* (11) 'In 2003, social psychologist Thomas Babor and his colleagues… established four criteria, now largely accepted by the public-health community, that justify the regulation of alcohol – unavoidability (or pervasiveness throughout society), toxicity, potential for abuse and negative impact on society. Sugar meets the same criteria, and… it similarly warrants some form of societal intervention'. As with alcohol, Robert Lustig and his co-authors recommend taxation, and statutory restrictions on availability and marketing.

Support in the UK and other countries

Influential newspapers such as *The New York Times* and in the UK *The Guardian* and the *Daily Mail* are giving a lot of coverage to the sugars and syrups story. The British food writer Alex Renton (centre, above), writing in the UK Sunday *Observer*, believes that special attention needs to be given to sweet drinks – carbonated colas and other 'sodas', and also sugary fruit drinks(12). Thus 'My-5 Fruit Shoot', targeted to parents and children, whose sweetness from fruit juice is boosted with chemical sweeteners, contains nearly as much sugar as 'regular' Coca-Cola or Pepsi-Cola. A 200 ml bottle contains two-fifths of the maximum daily amount recommended for a child of 6. Public interest organisations like the US Center for Science in the Public Interest, and in the UK Sustain (the alliance for better food and farming) are also hostile to sugar, especially as advertised to and consumed by children in sugared ultra-processed food and drink products. Sustain has brought together a total of 67 public interest and professional organisations, to insist that government taxes sugary drinks (13).

Sustain campaigns director Charlie Powell (second from right, above) says 'Parents' best efforts to encourage their families to eat healthily are undermined by cynical multimillion-pound marketing strategies that present sugary drinks as fun and fashionable… As government chooses to ignore the science that clearly classifies sugar as toxic, it's no surprise that public health policies fail to protect children'. But 'there's no question that political action on sugary drinks is on its way. The science and the public health pressures continue to mount'.

Box 1

Sugars and syrups, obesity, and the metabolic syndrome

For close to half a century it has been generally agreed by senior nutrition scientists that the main single nutritional cause of coronary heart disease is saturated (hard) fat (8). It has also been generally agreed that diets high in sugar – or to be more exact added sugars and syrups – are a cause of tooth decay, but not of diabetes and heart disease except inasmuch as they cause over-consumption of dietary energy and thus obesity, which increases the risk of various diseases. Dietary guidelines have stressed limiting the consumption of fresh or minimally processed foods of animal origin, such as meat, milk and dairy products, as well as of ultra-processed products such as burgers, cakes, pastries, biscuits and fatty snacks. Since the 1970s manufacturers most of all in the US have responded by reformulating such products so as to contain less fat – but more sugar.

Commentators point to the fact that Big Sugar, which represents the interests of Big Food manufacturers and sugar-producing countries, has diverted the attention of researchers and policy-makers away from sugar (14,15).

The clinical case against sugars and syrups

Now some distinguished nutrition scientists believe that diets high in added sugars or syrups, and in particular those that include a lot of sugared soft drinks ('soda') are a direct cause of obesity. They point to the fact that fructose, contained in sugar (sucrose) as well as in high-fructose corn syrup, in substantial quantities creates insulin resistance, deranges liver function, and also increases blood triglycerides, which they see as an independent risk factor for coronary heart disease (16,17). This and much other evidence is emphasised by Robert Lustig and Gary Taubes in their advocacy.

On diabetes, as one example, writing for the US-based on-line journal *Huffington Post* (18), following a co-authored paper in *PLoS One* (19) Robert Lustig states: 'When you do the math, fully one-quarter of the world's diabetes is explained by sugar alone. The food industry has contaminated the American food supply with added sugar to "sell more product"... Of the 600,000 food items in the American grocery store, 80 percent have been spiked with added sugar; and the industry uses 56 other names for sugar on the label. They know when they add sugar, you buy more. And because you do not know you're buying it, you buy even more. The outcome: By the year 2050, one-third of all Americans will have diabetes'.

In a co-authored commentary in *Nature* he says that obesity is not the cause of but a marker for the metabolic syndrome, which as well as diabetes includes hypertension, cardiovascular disease, non-alcoholic liver disease and dementia. He adds: 'Sugar in excess is a toxin, unrelated to its calories. The dose determines the poison. Like alcohol, a little sugar is fine, but a lot is not. And the food industry has put us way over our limit' (20).

Some governments are beginning to respond. In France a tax of 7 cents per litre on sweetened soft drinks introduced in January 2012 has reduced consumption so far by over 3 per cent. Formal restrictions are also in place in Denmark, Finland and Hungary. In the US more than 30 state and city legislatures, from Hawaii to New York, have discussed or proposed curbs on such 'soda', ranging from bans in schools to cuts in portion sizes and a sales tax. And in November 2013, the Mexican Senate passed a law taxing sugary processed products including soft drinks (21).

Grass-roots movements are also growing. Scotland is just one example. Children in Scotland consume more sugary drinks than anywhere else in Europe: the equivalent of 287 cans a year, and now 30 per cent of under-15s are overweight. Scottish farmers Mike and Karen Small (above, right), who have launched *The Fife Diet* movement (22) are campaigning for a tax on sugared drinks. Mike Small says: 'It's going to happen, because it's just so bloody obvious. Type 2 diabetes has doubled. They're amputating limbs from people in their 20s'. He adds 'The Scottish government is in the right frame of mind for regulatory control, rather than soft policies for behavioural change. Because those just don't work with tobacco, alcohol and sugary drinks. These are addictive substances'.

The Observer speaks out

Alex Renton's report is backed by an *Observer* editorial (23). This begins without equivocation: 'Excess sugar in our diets is causing obesity and diabetes. Now is the time for tough legislation to regulate the food industry. People in the UK are now on average over 15 kilograms heavier than half a century ago'.

The editorial continues: 'Research – and the determination of a handful of champions such as US paediatrician Robert Lustig… has revealed a far more insidious process that encompasses all the horrors of addiction. A couple of decades ago fat was the main area of concern. Now added sugar is seen as the single most important factor in what some term the 'diabesity' epidemic. Sugar, ironically, is often added to 'healthy food' to compensate for loss of taste when fats are reduced or removed. Most rich countries saw sugar consumption increase by 30-40 per cent between 1970 and 2000'.

The editorial continues: 'The food and drinks industry is in a state of denial about added sugar that is akin to the attitude of the tobacco industry 40 years ago. That must change. Government, in Europe and the US, is still subsidising the production of cheap (and unnecessary) sugar, queering the world sugar market, damaging farmers in poor countries, subsidising the big food and drink companies and ruining the health of many, and the poor in particular. 'Soda taxes' exist in France and some other European countries and they should be imposed here – not least to meet the cost of the expanding waist of the nation. Scotland may lead the way'.

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Sugary and fatty food and drink products

Some junk foods seem to be addictive

Access September 2012 editorial on addiction here
Access September 2012 Kelly Brownell, Mark Gold on addiction here
Access April 2013 Update Michael Moss on addiction here
Access June 2013 Update on decline in human intelligence here



After regular swigs of sugared drinks, laboratory rats don't know whether they are coming or going. Does this account for the rising rates of dementia and evidence for general human dumbing down?

The Update team reports:

Another strike against sugared processed foods and drinks concerns mental health. Last year *Update* commented on a study that people living in industrialised countries these days on average seem to be quite a lot less intelligent than their predecessors of 150 or so years ago (1-3). As stated in the study: 'The Victorian era was characterised by great accomplishments. As great accomplishment is generally a product of high intelligence, we tested the hypothesis that the Victorians were actually cleverer than modern populations' (3). The results indicate a general 'pronounced decline in IQ since the Victorian era, three times bigger than previous theoretical estimates.' The study compared reaction times since the late 1800s to the present day. These suggested that on average people now are less smart than their ancestors, with a loss of 1.23 IQ points per decade or a whole14 IQ points since Victorian times.

Rocket fuel

One influential group of specialist nutrition scientists believe that the main cause for this decline is a *relative or absolute deficiency of essential fats* of the type that make up most of the solid matter of the brain (1). But an alternative suggestion, following experiments on laboratory rats, is excess of added sugars, or else of energy-dense, fatty, sugary and syrupy food and drink products in general.

Many parents complain that sugared food and drink products have an impact like rocket fuel on their children, apparently causing uncontrollable over-activity. Researchers in Australia think they may have found out why. Their work, presented in November 2013 at the annual conference of the Society for Neuroscience in San Diego, California, has been reported throughout the world (4). Their small

experiment was on laboratory rats. They found that 20 per cent of the proteins produced in a brain region related to decision-making were altered in rats that drank sugary drinks, compared with those given water. The behaviour of the rats fed the equivalent of sugared or syruped soft drinks (cola, or soda) was obviously different. They rushed around their cages and mazes without apparent control – the rat equivalent of hyperactive children 'climbing up the walls'.

'For many people around the world, soft drinks are their sole source of liquid, or at least they provide a very high proportion of their daily calories' said investigator Jane Franklin. 'We know that soft drinks are bad for your body, so it's reasonable to assume that they aren't doing anything good for your brain either'. She and her colleague Jennifer Cornish gave 24 adult rats either water or a solution of water containing 10 per cent sugar – as contained in sugared soft drinks – for 26 days. Then for a week both groups were given only water.

At the end of this week of being off sugar, the rats that had been fed sugar were still jumpy, remaining significantly more active than the control group. The researchers then killed all the rats and examined their orbital frontal cortex, the part of the brain that sits behind the eyes. A total of 20 per cent of the proteins in this part of the brain were altered in the rats that drank sugary drinks. Roughly one third of the changed proteins are related to relative resistance or vulnerability to conditions such as cancer, and diseases of the nervous system such as dementia, Parkinson's disease, and schizophrenia. Jane Franklin concluded: 'Sugar exposure has the potential to alter a lot of diverse biological processes and play a role in neurological disorders – much more than we expected'.

Addiction to ultra-processed products

Other experiments on laboratory rats have implicated the equivalent of diets based on ultra-processed products in general. Summarising a study published in *Nature Neuroscience* (5), co-author Paul Kenny says it 'explains what happens in the brain of these animals when they have easy access to high-calorie, high-fat food. It presents the most thorough and compelling evidence that drug addiction and obesity are based on the same underlying neurobiological mechanisms. In the study, the animals completely lost control over their eating behavior, the primary hallmark of addiction. They continued to overeat even when they anticipated receiving electric shocks'.

The investigators fed the rats the type of diet that makes humans fat – the equivalents of energy-dense products high in fats or sugars such as sausage, bacon, and cheesecake. Soon after the experiments began, the animals got fat fast. 'They always went for the worst types of food, and as a result, they took in twice the calories as the control rats. When we removed the junk food and tried to put them on a nutritious diet, they simply refused to eat. The change in their diet preference was so great that they basically starved themselves for two weeks after they were cut off from junk food'.

Rats are not humans, and researchers are not able to feed groups of people different diets, observe their behavior, kill them, dissect their brains, and see what has been happening. But there is no need, thanks to the marvels of modern medical technology. There are plenty of human studies using magnetic resonance imagery. *Nora Volkow,* since 2003 director of the US National Institute on Drug Abuse, has already concluded that ultra-processed products, formulated to be ultra-palatable, act on the same brain pleasure centres as do hard drugs, cigarettes and alcohol, as have a substantial number of other researchers working with laboratory animals and with human volunteers (6,7). Until recently the idea that such products could be addictive has been generally identified as being held mainly by irrational activists. Times have changed.

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