

## RESPONSE TO RORY ROBERTSON

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The *Australian Paradox* reported the observation that upward changes in the prevalence of overweight and obesity in Australia run counter to changes in *refined* sugars intake (1). Rory Robertson claims there is no Australian Paradox, just unreasonable treatment of the available data. Unfortunately, there are factual errors in Mr Robertson's essay and misinterpretation of the distinctions between total sugars vs refined sugars, sugar availability vs apparent consumption, sugar-sweetened and diet soft drinks, and other nutrition information. The terminology, strengths and limitations of various nutrition data are readily understood by individuals trained in nutrition.

### **Our peer reviewed, published analysis showed a consistent decline in refined sugar (sucrose) consumption by Australians over past decades**

*The Australian Paradox* relied on three independent lines of evidence: national dietary surveys, beverage industry data and apparent consumption data from the United Nations Food and Agricultural Organisation (FAO).

National Dietary Surveys provide the most reliable estimates of food intake and therefore *total sugars*, but they do not tell us exactly what proportion is refined sugar. Total sugars intake includes the naturally-occurring sugars in fruits, vegetables, milk and dairy products as well as 'added' sugars. Australian Dietary Guidelines recommend two serves of fruit a day, equivalent to ~20-30 g natural sugar, and 5 serves of vegetables, providing ~20-25 g. A glass of milk contains 12 g natural milk sugar, and 2-3 serves are recommended. A healthy diet could contain 90 g of naturally-occurring sugars.

In the last National Nutrition Survey in 1995 (2), 95% of Australian adults consumed less than 115 g of total sugars per day, a level well within international guidelines of <25% energy (3). Although there were small increases in *total* sugars from 1983 to 1995, there were sharper declines in 'sugary products' such as soft drinks that contribute *refined* sugar to the diet. Importantly, intake of fruit and vegetables increased (4), implying that the absolute intake of refined sugars had declined. Knowledge of food composition is critical to interpretation of the data.

In the 2007 national survey of Australian children (5), total sugars (naturally-occurring and added) amounted to 99, 112, 135 and 145 g per day for children aged 2-3, 4-8, 9-13 and 14-16 years, respectively. On average, they consumed ~16 g/day less sugar from all sources in 2007 compared to 1995 (4;5). In 1995, they consumed 3.3% of energy as sugar-sweetened beverages; in 2007, the figure across all age groups was only 1.6% (6). This stands in stark contrast to 18% of energy in American adolescents, a level that is a cause of concern.

*The Australian Paradox* also utilised statistical information provided by the website FAOStat (7). Compiled by trained professionals and accessed by business and governments for economic analysis and policy setting, FAO data permit the analysis of time trends in apparent consumption of food commodities within and between countries. Australian data on FAOStat are supplied by the Australian Bureau of Statistics using information gathered by the Australian Bureau of Agricultural and Resource Economics (ABARE). This line of evidence indicated that while per capita refined sugars consumption has steadily declined in Australia since 1970 (7;8), the USA displays a marked increase (7).

‘Apparent’ consumption data are estimates of food intake based on considering a country’s production, imports, exports, wastage and non-food uses of particular commodities. It is at best only a crude approximation of actual food intake but every student of nutrition learns its limitations. However, applied over time and across countries, it provides valuable information about *trends* in consumption. This was the rationale for using it as one line of evidence.

Curiously, Mr Robertson dismisses the FAOStat data, citing ABARE data instead (9) as ‘the only timely official information on Australia-wide ‘sugar availability’’. He equates sugar availability with sugar consumption (real or apparent). He makes adjustments for population increases and concludes that ‘the trend over the past 22 years has been up and not down’.

But sugar availability is a not the same as consumption. Sugar availability takes no account of food wastage, use in animal food, beer and alcohol fermentation, or in non-food industrial use, and we cannot assume that a *steady* portion is lost in this way. Globally, raw sugar is an important ingredient for ethanol production. In Australia, ABARE data (10) show that ethanol production as a biofuel for transport rose from 42 million litres to 209 million litres (almost 4-fold) from 2005 to 2009<sup>1</sup>.

Mr Robertson also fails to note that per capita availability and consumption figures for virtually all food products (poultry, seafood, dairy, cereals, fruit and vegetables), are up in the past 22 years (8). That’s not so surprising. The average Australian is now significantly older, taller and heavier than they were 30 years ago (11;12). More food energy from protein, fat and carbohydrate is required just to maintain weight. If we eat more of everything, then the proportion of energy contributed by refined sugar will not change.

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<sup>1</sup> If 100% raw sugar were used for this purpose and the fermentation process were 100% efficient (it isn’t), it would require ~14 kg per capita per year, ie a significant proportion of the ‘available’ sugar. Although there are no firm figures for how much raw sugar is presently being used for ethanol production, supplies of C-molasses alone are not adequate, and the absolute amounts are likely to be increasing.

Mr Robertson claims that total *volume* sales of soft drinks have increased but fails to distinguish soft drinks that are sugar-sweetened from those that are 'diet' or low-joule flavoured waters. Diet soft drinks have increased markedly, now representing 1 in 3 soft drinks sold according to beverage industry data. In the Australian Paradox (1), we documented that sugar-sweetened sales per capita have declined *since 2003*, a period during which the prevalence of obesity continued to climb.

Considered together, these three lines of evidence are consistent with a decline in the consumption of refined sugar in Australia in recent decades.

### **Is fructose a toxic carb?**

Mr Roberston expresses concerns about fructose intake in particular. The primary refined sugar used in Australia is sucrose, which yields 50% fructose by weight. Fructose also represents about ~50% of the natural sugars in fruit, vegetables and grains (13). The large majority (95%) of Australians consume less than 70 g of total fructose per day from all sources. A threshold of ~100 g/day of pure *added* fructose has been suggested to cause weight gain and adverse effects on metabolism (14;15).

Two recent systematic literature reviews of all available human research on fructose (14;15) make similar conclusions "*Fructose does not seem to cause weight gain when it is substituted for other carbohydrates in diets providing similar calories. Free fructose at high doses [ $>104$  g per day, or 25 teaspoons] that provided excess calories modestly increased body weight, an effect that may be due to the extra calories rather than the fructose.*"(15). This evidence does not support the claim that "*sugar is toxic*".

We agree that there is no shortage of refined sugars. We agree that they can be a source of unwanted kilojoules. However, we and many other nutritionists believe refined sugar can be consumed in moderation (up to 10% of energy or ~50 g) as part of a healthy balanced diet. Often overlooked is the fact that refined starches (eg cornstarch, modified starches, maltodextrins) and foods high in starch such as white flour and white flour breads, rice crackers, corn chips and crisps, can also be a source of unwanted kilojoules, devoid of essential nutrients unless fortified. There is little logic to dietary recommendations that emphasise restriction of refined sugars but ignore refined starches.

**Fructose was not 'scarce'**. From an evolutionary perspective, fruit and therefore fructose, was an important component of intelligent primate diets. Recent data show that mountain gorillas derive over 20-40% energy from fruit for 6 months of the year (16). The anthropological literature shows that fruits that dried on the vine were available year round. In the 1980s, we analysed hundreds of traditional Aboriginal bushfoods sent to us from all over Australia,

including sugarbag (bush honey) and dried bush fruits, such as the bush tomato *Solanum centrale* containing 80% sugars (17). Like many animals, our ancestors adored honey (~70% sugars) and made sweet drinks using both honey and floral nectars (18). Apiculture, the art of raising bees, was widely practiced even by the poor. Indeed at certain times in history, consumption of honey may well rivalled our current consumption of refined sugar (8;18). Both evolution and anthropology therefore indicate that fructose consumption was a significant source of carbohydrate energy in human diets. Starch is the relative newcomer (19). Nutritional analysis of a typical low GI menu generates 70 g total sugars/day, of which 35 g would be fructose.

### **A message of moderation**

We want to be a voice of science, moderation and reason in the debate about food and health. The current fructose frenzy is analogous to the phobia about fat that distorted nutrition advice a decade ago. We strongly believe that it distracts both health professionals and the general public from more important causes of chronic disease. It also re-directs consumers, research and development dollars towards artificial sweeteners, and it reduces the enjoyment and quality of life for millions of people who enjoy a 'spoonful of sugar'.

Rather than focusing solely on the sugar content of a food or beverage, we (and the the GI Foundation) consider the total amount of carbohydrate, its GI, and overall nutritional quality, including the amount of fat, saturated fat, salt and fibre. Over 30 years of credible, scientific evidence supports the health benefits of low GI diets. This includes level 1 scientific evidence that a low GI diet facilitates the management of diabetes (24), weight loss (20) and weight loss maintenance (21) and reduces the risk of developing type 2 diabetes (22;23), diabetes complications (24) and other chronic lifestyle diseases (23;25).

### **In summary**

Three different, independent sources of evidence indicate that Australians' intake of refined sugars intake has *not* increased. By several indicators, it has declined over the same timeframe that the prevalence of overweight and obesity has risen strongly. This paradox challenges the view that concentrated sources of sugar, sucrose or fructose are primary players in the genesis of chronic disease.

## References

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