



FACT SHEET

Sugar - what, where, when?

This fact sheet looks at the sugar intake of New Zealand adults and children, the relationship between sugar intake and obesity and outlines current advice on how much we should be consuming.

Sugars are types of carbohydrates which are found in a wide variety of foods. Carbohydrates contain carbon, hydrogen and oxygen and are the main energy source for the body. As such, sugar is an integral part of our diet and because

sugar is present in many different forms, it performs numerous roles in foods and beverages. There is often misunderstanding about where sugar occurs in the diet and exactly how much we are consuming.

Where is sugar in our diet?

As shown in Figure 1, the sugar in our diet comes from different sources, and there are varying ways in which these are described. This includes the sugar that is naturally present in foods, that which is added to foods and a more recent definition, free sugars.* 'Sugar' or 'table sugar' typically refers to sucrose from sugarcane or sugar beets.

New Zealand food composition data on sugar do not distinguish between added and naturally occurring sugars and food composition data do not measure free sugars. However, the national adult nutrition survey and the more recent children's nutrition survey provide information on overall intake.^{1,2} Both surveys were able to calculate which foods contribute to sugar intake.

FIGURE 1

TOTAL SUGARS	
NATURALLY OCCURRING SUGARS	ADDED SUGARS
<p>Fructose – fruit, fruit juice, vegetables, honey</p> <p>Sucrose – fruit and some root vegetables</p> <p>Maltose – from starch during digestion and brewing</p> <p>Lactose – milk and milk products</p>	<p>All sugars added to foods and drinks in commercial and domestic preparation</p> <p>Includes discretionary sugar and honey – that people add to food and drinks themselves</p>

Relationship between sugar intake and obesity

Sugars themselves provide energy but are not a source of micronutrients. Therefore, it is often assumed that there is a direct and causative relationship between sugar and obesity. In fact an inverse relationship between sucrose intake and body weight or Body Mass Index (BMI)^{4,5,6} has been found and a report by the Institute of Medicine concluded there was "no clear and consistent association between increased intake of added sugars and BMI".⁷

Lately the association between the consumption of sugar sweetened beverages (SSB) and weight gain or obesity has gained much attention, both scientifically and politically. Research has been conflicting but a recent meta-analysis concluded, "The association between SSB consumption and BMI (among children and adolescents) was near zero, based on the current body of scientific evidence."⁸

The causes of obesity are multifactorial but the most plausible dietary mechanism for any positive association between sugar consumption and obesity is through the addition of extra energy to the diet.⁹ Sugar is a source of energy and excess energy consumption (from any source) will lead to weight gain.

In New Zealand, analysis of the information collected in the children's² and adult¹ national nutrition surveys looked at the relationship between the intake of sucrose (from 24 hour diet recall data) and BMI. The researchers concluded that there was no evidence of a positive association between current sugar (total sugars) or sucrose intake and body weight.

Other interesting conclusions included the following:

- Total sugars intake but not sucrose was significantly lower amongst obese, compared to normal weight, children.
- The predominant diet type for children was low fat/high sugar (35%) and for adults high fat/low sugar (40%).

* Free sugars come from both these areas. They are defined as all mono and disaccharides added by the manufacturer, cook or consumer, plus sugar naturally present and sourced from honey, syrups and juices³

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CONTINUED ► Relationship between sugar intake and obesity

- For both adults and children there was no significant difference between overweight/obese and normal individuals regarding energy intake from the four different diet types.
- There was no significant relationship between sucrose from sugar-containing beverages and BMI amongst children or adults. This included alcohol for adults.
- Obese men, women and children had significantly lower intakes of sucrose from sugar-containing beverages than normal weight individuals.

Recommended intake of sugar

For most people, high sugar foods should be eaten in moderation. They do not add to our essential nutrient intakes. Those who wish to reduce body weight by reducing energy intake and increasing energy output are best to limit their intake of high energy foods which includes sugar and sugary foods. Those individuals who are very active and of a normal body weight can enjoy such foods more readily but their consumption should be balanced with intake of other nutrient dense foods.

Whatever form sugar is consumed in, it contributes to our energy intake, with every gram providing 4kcal of energy. Foods, in which sugar is the main ingredient, and sugar consumed alone, are considered energy dense. Appropriate intake of sugar is dependent on an individual's total energy intake and output, and what foods or drinks have provided that sugar.

ENERGY VALUES

The energy provided by carbohydrate is similar to protein while fat provides over twice the energy content (refer to table 1).

TABLE 1

Carbohydrate (including sugars)	4kcal or 17kJ per gram
Protein	4kcal or 17kJ per gram
Fat	9kcal or 37kJ per gram
Alcohol	7kcal or 29kJ per gram

The World Health Organisation recommend that no more than 10% of our total energy comes from free sugars.³ There is no recommendation for intake of total sugars, which includes energy from foods containing naturally occurring sugar. However, it should be noted that this recommendation is based on the interpretation of a range of epidemiologic, social, economic and political impacts in the prevention and control of non-communicable diseases rather than being solely based on scientific evidence.¹¹

After completing a review of the science, the Institute of Medicine

concluded that there was insufficient evidence to set an upper intake level for total or added sugars.⁷

The New Zealand food and nutrition guidelines recommend that carbohydrate (which includes sugars) should contribute around 50% of total energy.¹² The difficulty in applying this recommendation is the fact that we are unable to separate free sugar intake from total sugar intake. It is therefore more practical to follow the recommendations of the Food and Nutrition Guidelines on sugar intake:¹²

- Choose foods and drinks that are low in sugar to avoid excess energy intake. Remember that non-alcoholic beverages such as soft drinks and fruit juices are a significant dietary source of sugar.
- Sweets, honey, sweet spreads and dried fruits are concentrated sources of sugar.
- Keep high sugar foods such as cakes and sweets for treats.
- To reduce dental decay, restrict the frequency of eating foods and drinking beverages with high sugar content. If eating sugary foods, do so at mealtimes instead of between meals.

Discussions around appropriate sugar intake should also consider a number of other factors. These include the following:

- Overall energy density of the food (total energy per gram). This will be determined by total fat, carbohydrate and protein content (which is likely to increase energy density) and water and dietary fibre (which will reduce energy density).
- Total amount of the food consumed.
- Nutrient profile of the food overall; that is, whether it provides other nutrients, such as vitamins, minerals and other trace-elements.





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Children's Nutrition Survey

NZ FOOD, NZ CHILDREN (2002)

Sugar – Total daily sugar intake primarily came from beverages, fruit, sugar and sweets (sugar and sweets are defined as sugars, syrups, confectionery, chocolate, jam, marmalade, honey, jelly, sweet toppings) and was calculated (median usual daily intake) as 109g (5–6 years) to 140g (11–14 years) for males, and 103g (5–6 years) to 123g (11–14 years) for females.

Table 2 shows sucrose was the predominant sugar in children's diets, followed by fructose, glucose, lactose and maltose. From this it is unknown what proportion is from naturally occurring or added sugars.

Sucrose – New Zealand children consumed most of their sucrose in the form of beverages (26%) with the most sucrose coming from powdered drinks (45%) and soft drinks (33%).

Fructose – Fructose in New Zealand children's diets came primarily from fruit (38%), beverages (32%), sugar and sweets (6%) and vegetables (4%). Fruit contributed a higher proportion of fructose to females' diets (40%) than males' (36%).

TABLE 2

Children's Sugar Intake g/day		
	FEMALES	MALE
Total sugars	112.5	124
Sucrose	61.1	67
Fructose	18.5	19.6
Glucose	16.5	17.8
Lactose	13.2	15.5
Maltose	3.2	4.1

Adult Nutrition Survey

NZ FOOD, NZ PEOPLE (1997)

Carbohydrate provided 45% of daily energy intake for males and 47% for females. As with children, the main source of carbohydrate in New Zealanders' diets was bread (20%).

Males had a greater total sugar intake than females although overall the proportions of sugar from glucose, fructose, lactose and maltose were relatively similar, see Table 3.

TABLE 3

Adults' Sugar Intake g/day			
	MEAN	MALES	FEMALES
Total sugars	122	139	105
Sucrose	59	69	49
Fructose	23	25	20
Glucose	21	24	19
Lactose	15	16	14
Maltose	4	5.1	3.1

Conclusion

Overall we can see that sugar in the diet comes from a great many food sources and includes sugar in all its different forms. However, it is not possible to determine what proportion of food might contain added sugar compared with naturally occurring sugar.

A simpler way of looking at having a healthy balance is to first ensure that total energy intake does not exceed energy output. Secondly; it is advisable to ensure that the overall nutrient composition of the diet is sufficient, by eating a wide range of foods from the main food groups.

Following this advice will minimise the need to worry about different types of sugars, as a moderate amount of sugar can be included and enjoyed as part of a varied and balanced diet and an active lifestyle.

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