Nutritional Guidelines for Healthy Living and Prevention of Decay
# CONTENTS

**Introduction** ................................................................................................................................................. 3

**3 Focus Areas for Healthy Teeth** .................................................................................................................. 5
  - Reduce the amount and frequency of sugars in your child’s diet .............................................................. 5
  - Brush twice daily for at least 2 minutes ...................................................................................................... 5
  - Take your child to a dentist every 6 months .............................................................................................. 6

**Understanding Complex Carbohydrates** ...................................................................................................... 10

**Nutritional Labels** ....................................................................................................................................... 13
  - Reading Food Labels .................................................................................................................................. 13
  - The Ingredients List ................................................................................................................................... 13

**Reducing The Amount of Dietary Sugar** ...................................................................................................... 15
  - 1. How to calculate sugar content per 100g of food or drink: ................................................................... 15
  - 2. How to convert the sugar content into number of teaspoons ................................................................... 16

**Reducing the Frequency of Sugar** ............................................................................................................... 17
  - Hints and Tips for Grazers ......................................................................................................................... 17

**So What’s Left to Feed My Child?** ................................................................................................................. 18
  - Include a serve of vegetables at every meal .............................................................................................. 18
  - Recommended servings of vegetables for children .................................................................................. 18
  - Include lean meats & proteins at most meals ........................................................................................... 18
  - Introducing new foods .................................................................................................................................. 19

**Nutrition During Pregnancy** ...................................................................................................................... 20

**Nutrition for Babies** .................................................................................................................................... 22
  - Current Guidelines ...................................................................................................................................... 22
  - Development of Taste Preferences .............................................................................................................. 22
  - Wholefoods for Babies ............................................................................................................................... 23
  - Introducing new foods to babies .................................................................................................................. 23

**Green Light Food and Drink** ....................................................................................................................... 24

**Orange Light Food and Drink** ................................................................................................................... 27

**Red Light Food and Drink** .......................................................................................................................... 29

**Green Light Food Ideas** ............................................................................................................................... 31

**Recipes** .......................................................................................................................................................... 33
Introduction

This nutritional guide has been prepared with a focus on eating the right foods for maintaining healthy teeth. Fortunately the types of food and drink that ensure healthy teeth go hand in hand with those recommended for good general health. Unfortunately the current generation of children are going to be fighting an uphill battle against the rising incidence of cardiovascular disease and Type II (diet related) diabetes. The latest figures also show that dental disease in young children is on the rise, despite our knowledge about what causes this preventable disease.

The most helpful changes you can make as a family for good general and dental health will be towards ‘real food’. This means fresh, natural foods that contain lots of naturally occurring vitamins and minerals, contain good fats and are low in sugars, refined carbohydrates, preservatives and additives.

Considering the combination of busy lifestyles and the extensive marketing of quick, easy packaged foods and pre-prepared snacks, this is not an easy task. Adding preparation of fresh foods to an already busy routine will be time-consuming, and the likely resistance you will encounter from your child will require a significant effort to overcome. I believe that the effort is well worth the benefits in knowing that you are fuelling your children (and yourselves) with all the building blocks needed for health, growth and good teeth.

The information in this guide is aimed at helping you understand which foods contribute to poor general health and decay. Diets containing processed foods high in refined carbohydrates & added sugars, low in nutrients and low in fibre contribute to complex medical conditions such as heart disease, cancer, diabetes and other chronic medical conditions, regardless of whether the person is overweight or not. The food your child eats is not about weight control, but more about how they are being set up metabolically for the future.

In the USA, childhood decay has been listed as the most common chronic childhood health condition, ahead of asthma and hayfever. In Australia, the situation is similar, with 50% of Australian children having had decay in at least one tooth by age 6. In contrast, the most commonly reported chronic medical condition is asthma, with 12% of children aged 0-14 being affected. For many of these children with decay, especially those with limited access to dental care, it becomes a chronic disease condition.

After a remarkable decrease in decay from 1970 (the ‘fluoride generation’), decay in children has been on the rise again over the past decade, despite increases in water fluoridation and other preventive measures.

As paediatric dentists, prevention of decay is our overwhelming aim. A child who has experienced decay will not only have to go through dental treatment
at a young age, but will remain susceptible to the disease throughout their lifetime. Once fillings have been placed in adult teeth, it often sets up a downward spiral of continuous repairs, increasing size of fillings, root canal therapy, crowns and sometimes extractions. This cycle generally repeats itself every 10-15 years as the filling materials fail, meaning this process occurs several times over the lifetime of a patient.

Decay is a complex disease that is caused by many factors (many of which are out of our control) and some children are much more susceptible than others. The best we can do to prevent the disease is to target all of the factors that are within our control, and change the conditions in the mouth towards a healthy environment. This generally includes restoring decayed teeth, reducing the frequency of carbohydrate intake, twice daily brushing and increased fluoride exposure.

This information is aimed at helping you identify a few dietary changes that you can make at home that will make a world of difference. Some of these changes will not be easy, and your child may have some difficulty getting used to changes in their usual routine. There may be times that it all seems too difficult, and it may take quite some time and effort to instigate all of the necessary changes. It is important to make one small change at a time, and allow enough time so that the change becomes routine to your child. If this involves changing or removing just one food type or product at a time, then so be it. If it takes years to implement all of the food changes you feel necessary for your family to be healthy—better late than never!

It is important to keep our end goal in mind – a decay-free child that doesn’t have to go through invasive dental treatment, and a child who takes good dental and eating habits with them into adulthood.
3 Focus Areas for Healthy Teeth

There are 3 areas to focus on that will make a significant difference:

**Reduce the amount and frequency of sugars in your child’s diet.**

Frequent carbohydrate intake is the factor most strongly associated with development of decay. This involves a reducing the amount and frequency of both sugars and refined carbohydrates. The information below will outline how to identify sugars and carbohydrates in your child’s diet, and how to replace them with healthier food choices.

**Brush twice daily for at least 2 minutes**

Decay is caused by the bacteria found in plaque. It is very difficult for decay to form when there is no plaque (and no sugars for the bacteria to feed on). Brushing off this almost invisible, very sticky film of plaque will ensure that minimal bacteria are present on the teeth to start decay.

These bacteria need to be brushed off 2 times per day to prevent a level of build-up that is dangerous to the tooth surface. After the night-time brushing there should be no more food or drink allowed except water.

Children under 6 should have a parent brush for them twice per day with children’s toothpaste unless otherwise directed by your dentist.

Regardless of their independent spirit, children from 6 to 8 years do not yet have adequate fine motor skills to brush effectively, so they still need help from a parent at least once per day (preferably at the night-time brushing), with adult strength toothpaste.

Children shouldn’t be expected to remember all by themselves to brush twice per day and may need consistent reminding for some years to get them into the habit. Most children are busy, easily distracted and have many other things in mind that they would rather be doing than brushing their teeth. Think about a brushing chart and a reward schedule to ensure brushing is positively reinforced.

Very young children often find brushing unpleasant and can sometimes be quite willful in resisting attempts to brush their teeth. With time and persistence they will realise that toothbrushing is a non-negotiable part of their routine, just like bath-time.
Take your child to a dentist every 6 months.

6 months comes around very quickly in the busy life of a parent, but it is a long time in the life of a primary tooth and a small child. This is an absolutely vital step in preventing future decay and catching problems at an early stage. Paediatric Dentists recommend check-ups from the age of 1.

There is very good evidence that professional application of fluoride every 6 months in children with adult teeth has the ability to reduce the risk of decay in children. It also gives us an opportunity to check in on how your child is brushing and discuss any changes to their diet.

Being able to come to the dentist and have a fun, simple visit every 6 months goes a long way towards giving your child a positive view of dentists.
What’s In Your Shopping Trolley?

What Are Carbohydrates?

The factor found to exert the strongest influence on development of decay is **FREQUENT CARBOHYDRATE INTAKE**.

Carbohydrates are found in a wide array of foods and also come in a variety of forms. The most common forms are sugars, fibre and starch. Sugars are simple carbohydrates and include fruit sugar (fructose), corn or grape sugar (dextrose or glucose), table sugar (sucrose) & milk sugars (lactose).

Complex carbohydrates included everything made of three or more simple sugars linked together, and include starches and fibre. Starch is the complex carbohydrate found in plants foods such as potato, corn, wheat & rice.

Simple sugars are the first thing you should try to reduce to maintain dental health. Identifying and limiting foods and drinks that contain sugar is not easy, but it is achievable with effort. Remember to be fair - the dietary changes can’t just apply to your child with dental problems, it has to apply to the whole family. Besides helping your child’s teeth, the whole family will benefit from healthy eating.

The next few pages will help you with a few suggestions on how to achieve a reduction in sugar.
Identifying Simple Sugars

- Simple sugars can be present in foods as any of the following:
  - Malt extract
  - Golden Syrup
  - Raw Sugar
  - Molasses
  - Monosaccharides
  - Polysaccharides
  - Disaccharides
  - Fructose
  - Invert Sugar
  - Malt
  - Malt Glucose
  - Brown Sugar
  - Corn Syrup
  - Dextrose
  - Lactose
  - Maltose
  - Sucrose
  - Glucose Syrup
  - Glucose
  - Honey

Finding Sugars in Nutritional Labels

Coco Pops

INGREDIENTS: Whole white rice (59%), sugar cocoa (3%), salt, minerals (calcium carbonate, iron, zinc oxide), flavours, dextrose, barley malt extract, vitamins (vitamin C, niacin, thiamin, riboflavin, folate). Contains gluten containing cereals. May contain traces of peanuts and/or tree nuts.

Rice Bubbles

INGREDIENTS: Whole white rice (90%), sugar, salt, barley malt extract, vitamins (vitamin C, niacin, riboflavin, thiamin, folate), minerals (iron, zinc oxide). Contains gluten containing cereals. May contain traces of peanuts and/or tree nuts.
Crunchy Nut Cornflakes

INGREDIENTS: Corn (55%), sugar, peanuts (7.5%), honey (2%), molasses, salt, barley malt extract, vitamins (vitamin C, vitamin E, niacin, thiamin, riboflavin, folate), minerals (iron, zinc oxide).
Contains gluten containing cereals, peanuts and soy.
May contain traces of tree nuts.

Nutri-Grain

INGREDIENTS: Cereals (44%) (wheat flour, oatmeal, maize flour), sugar, wheat gluten, molasses, salt, barley malt extract, minerals (calcium carbonate, iron), mineral salt (sodium bicarbonate), natural colour (paprika, turmeric), vitamins (vitamin C, niacin, thiamin, riboflavin, vitamin B6, folate).
Contains gluten containing cereals.
May contain traces of peanuts and/or tree nuts.

LCMs

INGREDIENTS: Rice Bubbles® breakfast cereal (32%) (whole white rice, sugar, salt, barley malt extract, vitamins [vitamin C, niacin, riboflavin, thiamin, folate], minerals [iron, zinc oxide]), glucose syrup, fructose, dark chocolate chips (8%) (sugar, cocoa mass, milk solids, cocoa butter, emulsifiers (322, 476), flavours), milk choc compound (8%) (sugar, vegetable oil, milk solids, cocoa powder, emulsifiers (322, 492), flavours), invert sugar, hydrogenated soyabean oil (antioxidants [320, 306, 304]), sugar, glucose solids, cocoa powder (1.5%), skim milk powder, humectant (glycerol), gelatin (beef), flavours, emulsifiers (soy lecithin, 472e), salt.
Understanding Complex Carbohydrates

For a long time now, we have been given the message that we should avoid simple sugars, but complex carbohydrates are OK. It turns out that the picture is a little more complicated.

Dividing carbohydrates into ‘simple’ and ‘complex’ makes sense on a chemical level, but it doesn’t do much to explain what happens to different types of carbohydrates in the mouth and the rest of the digestive tract.

For example, the starches in white bread are classified as complex carbohydrates, yet the body converts these carbohydrates to simple sugars nearly as fast as it processes pure glucose.

The digestive system (including the mouth) handles all carbohydrates in much the same way - it breaks them down (or tries to break them down) into single sugar molecules, as only these are small enough to cross into the bloodstream to be used as energy. Unfortunately these simple sugars are also the universal energy source of bacteria that cause decay.

Fibre is a complex carbohydrate that is an exception. It is put together in such a way that it can’t be broken down into sugar molecules, and so it passes through the mouth (and the body) undigested.

Fibre is found in the outer layers of grains, and is removed during processing (milling and grinding) to make white flour, white rice and cereals. These are called refined complex carbohydrates. This is why choosing wholegrain food products is so important. Besides being indigestible to bacteria in the mouth, fibre promotes health in many ways.

Soluble fibre binds to fatty substances in the intestines and carries them out as a waste, thus lowering LDL, or bad cholesterol. It also helps regulate the body’s use of sugars, helping to keep hunger and blood sugar in check. Insoluble fibre helps push food through the intestinal tract, promoting regularity and helping prevent constipation.

Fibre is found in beans (e.g. haricot, kidney, cannellini, lima, chick peas), whole grains (whole wheat, whole oats, barley, millet, brown rice, quinoa), bran, lentils, soy, nuts (especially almonds, Brazil nuts, peanuts and walnuts), seeds (linseed, chia seeds), fruit (e.g. raspberries, strawberries, cherries, blackberries & banana), vegetables such as broccoli, peas, cabbage, spinach, carrots & brussel sprouts.
Processed & Refined Complex Carbohydrates

The linked chains of sugars in starches and refined complex carbohydrates are broken down in the mouth to the simple sugars that cause decay. In general, caution needs to be taken with these types of foods.

Starches and refined complex carbohydrates are found in foods such as white bread, crackers, pasta and anything made from white flour (pastry, pizza dough, batters, some wholemeal and multigrain bread), white rice, potato and any grain that has been turned into ‘flakes’, ‘puffs’, ‘shreds’, ‘cakes’ crackers or chips.

This is a complex topic and there are several factors involved in how much potential these foods have in causing decay. Typically, the Western diet is high in carbohydrates, and it is the combination of consuming complex carbohydrates AND simple sugars in our diet that is believed to increase decay risk. This is in contrast to third world countries where complex carbohydrates are often the only source of food, yet because the diet is almost devoid of simple sugars, the decay risk remains very low.

A reduction the amount of processed, refined carbohydrates in your child’s diet will have several health benefits in the long-term as well as reducing their decay risk.

Another factor to consider in regards to carbohydrates and their risk of causing decay is how long the food takes to clear from the mouth. This means the length of time it takes to chew, swallow and have all of the food particles washed away by saliva. The longer the food particles are in the mouth, the greater the opportunity for saliva to break down the complex carbohydrates into sugars. Many types of complex carbohydrates take a long time to clear from the mouth, and therefore have an increased potential to contribute to decay. For example, a Sao biscuit takes longer to clear from the mouth than a boiled lolly.

In addition, processed foods like cheese puffs e.g. Twisties and Cheetos, potato chips, corn chips, pretzels, crackers e.g. Shapes, Jatz, Sao, rice cakes, rice crackers etc. are all processed at high heat which changes the structure of the starch. This processed starch structure is easily turned into sugars in the mouth, giving it a similar effect to eating simple sugar.

Children need carbohydrates for energy, but they should come from unrefined sources. Choose smart carbohydrates that will give sustained energy release such as wholegrains, vegetables, fruit, beans, lentils and legumes. These all provide sources of unrefined complex carbohydrates that are great for both teeth and general health.
Be aware that there are no composition standards for breads in regards to labelling. This means manufacturers can make bread with whatever percentage of the relevant flour they want. Wholemeal breads are made with varying proportions of wholemeal flour, so check the labels. Often the better quality breads will have percentages marked in the label. Multigrain breads are often made with white flour with various whole grains added.

‘Wholemeal wholegrain’ bread is made with wholemeal flour plus whole grains and is the best choice. E.g. Bürgen ‘Pumpkin Seeds Bread’. Note in its nutritional label below that ‘wheat flour’ (refined white flour) is third down on the list of ingredients.

**Ingredient Declaration**


In contrast, the main ingredient in Bürgen ‘Wholegrains and Oats’ is wheat flour:

**Ingredient Declaration**

Water, Wheat Flour, Mixed Wholegrains (13%) (Kibbled Corn, Oats [3%], Kibbled Rye, Kibbled Wheat, Kibbled Barley), Wheat Gluten, Oat Bran (6%), Linseed, Canola Oil, Baker’s Yeast, Honey, Vinegar, Iodised Salt, Cultured Whey, Vitamins (Thiamin, Folate).

In summary, have carbohydrates from whole grains (oats, brown rice, wholemeal flour), vegetables and fruit as your child’s every day sources, and limit foods such as pasta, white rice, white bread and crackers to occasional consumption.
Nutritional Labels

Reading Food Labels

Learning how to read and interpret food labels will help you to make healthy food choices for your child. Of course, the best foods to choose are unprocessed - those without labels, without a barcode and not requiring packaging. If it has a number in brackets after it – it’s not food!

Remember whole, real, unprocessed food is almost always healthy, regardless of how many grams of fat, protein and carbohydrates it contains. This means the best foods are fresh and unprocessed food such as vegetables, fruit, nuts, meats, beans & legumes, eggs & dairy.

A diet containing predominantly whole foods is going to be naturally low in sugar (good for teeth & general health), and high in vitamins and minerals that bodies need to function at their best.

Eating a diet containing entirely whole foods is increasingly difficult in today’s society. Finding foods with minimal ingredients on the labels and being able to identify those ingredients as actual food products is a good start. Try to choose foods with less than 5 ingredients on the label to ensure minimal processed ingredients, additives and preservatives.

The Ingredients List

Ingredients are listed in order of quantity, from the most to the least, excluding water. Look for ingredients that are fats, sugars and salt. If sugar is listed within the first three ingredients, the food is unlikely to be healthy.

You are likely to come across the ‘fat & sugar see-saw’ where foods higher in fats will be low in sugar and vice versa, e.g. potato chips. You may also have noticed that foods labeled ‘low-fat’ are generally high in sugar, and generally
not low in calories. The exception to the ‘see-saw’ will be foods like cakes, biscuits, muffins, nut bars, ice cream, chocolate etc. that are high in both fat and sugar.

If you choose whole, unprocessed foods that are higher in fat but low in sugar, you will find they contain good fats in addition to vitamins and minerals. E.g. nuts and seeds, avocado, dairy.

You may also have noticed that when a product has a low-fat alternative, it also contains lots of other (often unidentifiable) ingredients. Have a look at the example below of a relatively unprocessed food - full fat and low fat plain yoghurt:

**Black Swan Greek Yoghurt.**

**INGREDIENTS**
Milk, Cream, Milk Solids Non-Fat, Live Yoghurt Culture. All Natural Ingredients.

**Black Swan Low Fat Greek Yoghurt**

**INGREDIENTS**
Milk, Milk Solids Non-Fat, Fiber (Inulin), Thickener (1442), Halal Gelatine, Live Probiotic Cultures (Lactobacillus Acidophilus, Bifidobacterium, Lactobacillus Casei, >100 Million Per Serve), Live Yoghurt Cultures, Soy Solids.
Reducing The Amount of Dietary Sugar

Identify the amount of sugar in different food types will allow you to choose low-sugar options.

1. How to calculate sugar content per 100g of food or drink:

   • This method is a guide for comparing the content of **simple sugars only** (e.g., sucrose, fructose, glucose), not complex carbohydrates.

   • This method is useful for comparing different food choices, especially when the serving sizes are different. Using the per 100g column means you are comparing like with like.

<table>
<thead>
<tr>
<th>NUTRITIONAL INFORMATION</th>
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<tbody>
<tr>
<td><strong>Servings per package:</strong> 3 <strong>SERVING SIZE:</strong> 150g</td>
</tr>
<tr>
<td>QUANTITY PER SERVING</td>
</tr>
<tr>
<td>Energy</td>
</tr>
<tr>
<td>Protein</td>
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<tr>
<td>Fat, total</td>
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<tr>
<td>- Saturated</td>
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<tr>
<td>Carbohydrate</td>
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<tr>
<td>- Sugars</td>
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<td>Sodium</td>
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<table>
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<th>LOW SUGAR</th>
<th>MODERATE SUGAR</th>
<th>TOO MUCH SUGAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>5g or less</td>
<td>5.1-14.9g</td>
<td>15g or more *</td>
<td></td>
</tr>
<tr>
<td>DRINK per 100mL</td>
<td>2.5g or less</td>
<td>2.6-7.4g</td>
<td>7.5g or more</td>
</tr>
</tbody>
</table>
OR:

2. How to convert the sugar content into number of teaspoons.

Another way of being able to visualise the amount of sugar is to convert it into teaspoons. This is useful for calculating the exact amount of teaspoons in a serving. Be aware of the serving size, estimate the volume of food being eaten before you calculate. For example, most breakfast cereals state a serving size of 45g. Most older children would eat about double this in an average sized bowl.

- On the nutritional label find the ‘sugars’ section. Divide the amount of sugar by 4 to find out the equivalent number of teaspoons.

<table>
<thead>
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<tr>
<td>Servings per package: 3 SERVING SIZE: 150g</td>
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<tr>
<td>QUANTITY PER SERVING</td>
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<td>-Sugars</td>
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<tr>
<td>Sodium</td>
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10.5g ÷ 4 = 2.6 teaspoons

E.g., If there are 10.5g of sugar per serve, there are 10.5 ÷ 4 = 2.6 teaspoons of sugar in that particular serving of food.
Reducing the Frequency of Sugar

Reduce the number of times per day that children are allowed to eat food containing sugar and refined carbohydrates. Teeth need **2 HOURS** rest between consumption of any type of food or drink (except water). Eating more frequently than this means the teeth never get a break, and the mouth never gets a chance to wash away food, sugars and acids that cause decay.

**Hints and Tips for Grazers**

Some children are grazers and it can be difficult to control how often they eat, especially when they are not yet at school and may have access to food all day long.

Kids who are allowed to graze often have a hard time figuring out when they’re truly hungry — one key to maintaining a healthy weight in childhood and later in life.

Scheduled snacks served at the same times every day give kids a sense of control and also establish that food is available only at certain times. Offer two or three nutritious options and let kids choose.

Avoid using sweets to reward good behavior, which sends the message that desserts are somehow better or more valuable than other foods. Sweet treats are not required at the end of every meal.

- Children should have 5-6 small meals per day.
- Encourage children to sit at a table and eat, and whatever is not consumed is put away.
- Only allow water to sip between meals & snacks.

**Remember:**

- Parents are responsible for deciding **what** to feed and **when**.
- The child decides **how much** to eat. If you are only providing healthy foods, then maintaining your child in a healthy weight range will follow.

Children have an inborn ability to determine hunger and fullness. This means they can regulate their energy intake over a day even though any given meal may be very large or small.
So What’s Left to Feed My Child?

Reducing the amount and frequency of simple sugars and refined carbohydrates means that you have to find something to replace it with. This may well be a selection of foods that your child hasn’t tried, won’t try or doesn’t like. If you skip ahead to the section on ‘Green Light Foods’ you will see a broad range of healthy food options that should make up the bulk of your child’s food intake each day. The best way to keep your child full and reduce sugars is to increase the amount of vegetables, proteins and good fats.

Include a serve of vegetables at every meal

The Australian Dietary Guidelines recommend 2-4 servings of vegetables each day depending on age. This is impossible to achieve if vegetables are only served up as a side-dish at dinner time. Try the following tips:

- Eat vegetables like you eat fruit.
- Make cut-up raw vegetables available ALL the time at home. Prepare enough for a few days and place in a container in the fridge that is accessible to your child.
- Include a serve of crunchy raw vegetables at morning tea, lunch and afternoon tea e.g. carrot, cucumber, capsicum, cherry tomatoes or celery. For school aged children place in a ziplock bag in their lunch box. Even if they only eat one type and one or two pieces it’s better than nothing.
- Take advantage of pre-packaged vegetables to save time in the kitchen. Frozen spinach, peas and mixed vegetables still contain all the same nutrients as fresh.

Recommended servings of vegetables for children

- 75g or 1/2 cup cooked vegetables
- 1 cup salad vegetables
- 1 potato.

- 4-7 years - 2 serves of vegetables
- 8-11 years - 3 serves of vegetables
- 12-18 years - 4 serves of vegetables

Include lean meats & proteins at most meals

- For lunches, include leftovers from dinner that are good cold such as chicken drumsticks, grilled chicken strips, sausages, strips of steak, meatballs. These can be given as finger food, or in wholemeal sandwiches or pita pockets/wraps.
• Nuts
• Boiled eggs
• Yoghurt
• Cheese

Introducing new foods

Praise children when they try new foods. Be patient and persistent – continue to offer a food if it is rejected. It can take up to 15 times for a child to accept a new food, so don’t fall back to high carbohydrate foods just because your child refuses to eat the healthy options you provide after only a few tries.

In the meantime, sneak it in. Add pureed or grated vegetables to meatballs, sauces, smoothies, wholemeal muffins, soups, vege burgers or patties etc. Adding a small amount of cheese or butter to steamed or grilled vegetables can work wonders.

High-speed blenders, such as the models manufactured by Blend Tec or Vita-Mix (not juice extractors that take out the pulp and fibre) can turn fresh vegetables into a smoothie that may be accepted when the raw or cooked versions are rejected. Don’t be discouraged, tastes change with time and persistence. Children don’t enjoy olives & strong cheeses either, but look what happens over time (along with beer, wine and coffee)!
Nutrition During Pregnancy

There is growing evidence that a woman’s body composition and diet at the time of conception and during pregnancy has significant effects on the subsequent health of her children well into their later life.

This information derives from research carried out 20 years ago by Dr David Barker, a professor of cardiovascular medicine in the United States. He showed that children who have a low birth weight are at greater risk of developing coronary artery disease later in life. This is now known as the ‘Barker Hypothesis’.

‘Low birth weight’ refers to children born small due to lack of growth, as opposed to children born prematurely at the correct weight for gestational age.

Continued expansion of this research has shown that poor nutrition in the womb changes the structure and function of the child’s body for life, and makes them more vulnerable to heart disease, diabetes, stroke, osteoporosis and cancer.

Nutrition in the womb is related to the mother’s nutrition in several ways. A baby’s growth does not only depend on what its mother eats each day. This would make it too vulnerable to the mother becoming temporarily short of food or ill.

The baby is also nourished by the stores of nutrients in the mother’s muscles, fat and bones. Protein, fat and calcium are released from these tissues each day and then re-incorporated back into the tissues. This process called ‘turnover’, is constantly enriching the mother’s blood with nutrients for the growing baby. A woman’s turnover is built up in response to her dietary experiences through her life. It is thought that the dietary experience of females in early childhood are the greatest determining factor, rather than the time around conception.

Maternal intake of fruit and green vegetables during pregnancy is positively associated with good birth size and glucose tolerance in children. Higher calcium intake during pregnancy has been associated with lower blood pressure in the offspring during childhood. Micronutrients (vitamins and minerals) may also play an important role in programming of the child’s health in later life.

Over-nutrition during pregnancy is also becoming increasingly common in many developed countries. Over-nourishment of the foetus changes metabolic function for later life in a similar way to under-nutrition. This includes impaired glucose tolerance, obesity and cardiovascular disorders.

Although exposure to severe famine is rare in Western societies, maternal under-nutrition around the time of conception may be more common than previously recognised. One study of low birth weight babies in Sydney reported that one
third of mothers with small for gestational age babies had been previously diagnosed with an eating disorder. A doubling in the risk of pre-term, low birth weight and small for gestational age babies have also been reported for women whose eating disorder had been treated before the beginning of pregnancy.

It is so important to teach young girls to eat for health, and not for weight or appearance. Waiting for the teenage years to start teaching healthy eating habits is too late, especially since the incidence of eating disorders is being increasingly diagnosed in children as young as 10 years.

The next chapter discusses starting good nutrition early, and the effects that early feeding habits have on food preferences and health in later life.
Nutrition for Babies

Current Guidelines

The current Australian guidelines recommend that babies are breastfed until 6 months of age, with solids or complementary foods introduced from 4-6 months depending on the nutritional needs of the child. Complementary foods include any nutrient-containing solid or liquid foods other than breast milk or formula. By 6 months of age, human milk becomes insufficient to meet the requirements of an infant for energy, protein, iron, zinc, and some fat-soluble vitamins.

The current Australian guidelines suggest that white rice cereal is a good first food. However, there is a recent shift away from rice cereals as a first food. This is on the basis that there is a lack of evidence for this choice, and that first foods for babies should be naturally nutrient-rich, including protein and fibre, along with the A, C, D and B vitamins.

In light of these criteria, rice cereal is a less than perfect choice for the first complementary food given to infants. Rice cereal is low in protein and high in carbohydrates. The ‘White Out’ movement in the USA was started by a paediatrician, Dr Alan Greene, with a philosophy of ‘let every child’s first grain be a whole grain’. Their aim is to make feeding white rice cereal to babies obsolete. For the past 50 years the majority of babies in the United States have been given white rice cereal for their very first bite of solid food. Dr Greene’s reasoning for abandoning white rice cereal is as follows:

Development of Taste Preferences

After babies learn to walk, toddlers and preschoolers develop an increasing suspicion and fear of new flavours, new food sources and new styles of eating. Historically this makes sense, as not trusting new foods is a normal, protective mechanism aimed at preventing consumption of toxic or poisonous substances. Before this phase, babies will happily put almost anything in their mouths.

Some taste preferences are hardwired, and different babies experience taste differently. But it is believed that early exposures and positive social interactions associated with food outweigh genetics when it comes to food preferences. Approximately 85% of variability in eating patterns is due to environmental, not genetic factors.

At this age it normally takes between six and sixteen experiences with a flavour before it becomes accepted. Somewhere between six and ten times is the most common. During this critical window for taste acquisition, repeated offerings – even of a rejected flavour – are likely to result in acceptance of the food.

In one study, researchers identified babies whose mothers had given up on some particularly protested vegetable after the babies had rejected it on two
or three occasions. This disliked vegetable was then offered again every other day. At first, the babies’ intake of the disliked vegetable was low. Yet by the time the babies had sampled it seven or eight times in the study (nine to eleven times in their lives), over 70 percent of the babies not only accepted the previously rejected vegetable, but readily ate as much of it as they did of their previous favourites.

In stark contrast to vegetables and fruits, processed white flour cereals are often given to babies more than a dozen times before another food is even introduced. These cereals then go on to be a staple and predominant source of calories throughout infancy. Conversion of the white rice flour to glucose begins while the cereal is still in the baby’s mouth, lighting up the hard-wired preference for sweets. The cereal is nearly 100% glucose by the time it is absorbed in the intestine. It is easy to see how a preference for processed refined grain products could become firmly established and a challenge to change.

According to Dr Frank Greer of the American Academy of Pediatrics Committee, there is no good reason not to introduce meats, vegetables, and fruits as the first complementary foods. Introducing these foods early and often promotes healthy eating habits and preferences for these naturally nutrient-rich foods.

**Wholefoods for Babies**

Let every child's first food be a real food. Try something they’ve seen a parent eat such as pureed avocados, sweet potatoes (cooked until soft), or bananas mashed with a fork with some of the breast milk or formula they've already been getting. Alternatively, find a wholegrain version of baby cereal, or prepare your own wholegrain cereals.

The American Academy of Pediatrics maintains that there is no real benefit from holding off on meat for any specific amount of time. For babies who were exclusively breastfed up until starting solids, meat is a good choice as it replaces protein, zinc and iron found in breastmilk. In contrast, iron salts present in infant cereal are generally insoluble and poorly absorbed. Lean meats can be pureed just like fruits and vegetables.

**Introducing new foods to babies**

The best way to get your baby to eat any new food is to desensitise them to the taste. There is good evidence that this can be accomplished by giving the new food for the first bite of solids each day for 10 days straight. If the baby rejects the food, take it away, continue feeding the preferred food and try again the next day. Some new tastes take longer to acquire than others, but continuing to expose your child to small amounts of healthy foods until it is accepted will pave the way for good eating habits in the years to come.
Green Light Food and Drink

Food with <5g/100g of sugar
Drinks with <2.5g/100mL of sugar

Everyday food. First things first, get rid of as much high sugar, highly processed food as possible (red light and orange light foods). If it is still hanging around in your pantry appearing to be an option, your child will ask for it. For most of the younger children you can count on “out of sight, out of mind.” Allow your child to eat as much ‘green light’ food as they need, however try to maintain a good variety of food types.

**Breakfast cereals:**

Porridge (plain) made with water – 0g
Weetbix – 3.3g

**Bread/cereals:**

Wholemeal wholegrain bread
Vita-Weat (original) – 1.8g
Ryvita (original) – 2.7g

**Dairy:**

Yoghurt (natural/plain/Greek) – 4.8g
Cheese – 0.5g
Philadelphia cream cheese – 2.7g
Homemade custard with 1< teaspoon sugar per 100 mL.

**Other:**
Vegemite - 2.2g
Hommus - 0.5g
Dip – French Onion – 2.3g
Fruit – variable (2-17g)
Nuts – variable
Eggs – 0.3g
Cheese - 0.5g
Beans (e.g., 4 bean mix) – 2.2g
Baked beans – 3.4g
Meat: 0.9
Canned tuna/salmon/smoked salmon <5g

Vegetables

Drinks

Water
Fruit

The Australian Guide to Healthy eating recommends:

1-2 servings of fruit for a 4-7 year old
1-2 servings of fruit for 8-11 years
3 servings of fruit for adolescents aged 12-17 years.

A sample serving of fruit is:

1 medium piece e.g., apple, pear, banana, orange
2 small pieces e.g., apricots, plums, kiwifruit, grapes
½ cup juice (120mL or half a Popper).
dried fruit e.g., 4 dried apricot halves.

Whilst the Australian guidelines include juice and dried fruit as acceptable, for a child with previous dental decay it is best to avoid these options and serve fresh fruit only.

Sugar content of fruit per 100g

Banana – 16.9g
Grapes – 15.5g
Cherries – 10.9g
Blueberries – 10.8g
Apple – 10.4g
Pear – 8.9g
Peach 8.5g
Nectarine – 8.1g
Apricots – 6.6g
Plums – 6.5g
Strawberries – 2.7g

You may have noticed from the above list that most fruits fall into the ‘moderate’ and ‘high’ sugar categories. Fruit is an important part of a child’s diet and full of vitamins and minerals but also being high in sugar it is important that it is not your child’s most frequent snack.

Limiting the suggested servings of fruit per day to main meal times, rather than snacks is also helpful as other food will be present to neutralise the acids and sugars. Encourage your child to eat the serving in one go, rather than eating small amounts frequently during the day.
Orange Light Food and Drink

Food with 5-14g/100g of sugar
Drinks with 2.6-7.4g/100mL of sugar

Frequency and amount of these foods should be limited (e.g. once a week or less). Try to substitute lower sugar options of the same food type if possible, with the aim of moving towards unprocessed wholefood options. In general, these should be considered ‘Sometimes Foods’, with the exception of milk which is required for daily calcium intake (see note below).

Breakfast cereals:

- Cornflakes – 7.9g
- Carmen’s Classic fruit muesli – 8.3g
- Special K – 14.5
- All Bran – 13.6g
- Rice Bubbles – 9g

Breads, crackers & processed carbohydrates

- Fruit bread
- Sao, salada
- Rice Cakes
- White bread
- Potato chips, Cheetos etc
- Flavoured crackers e.g. Shapes
Dairy:

Dairy Farmers – Thick and Creamy – Light, Strawberry – 6g
Yoghurt – vanilla – 12.7g
Jalna Low Fat Strawberry – 11.1g
Ski Divine – 12.2g
Yoplait – Original Strawberry – 13.5g
YoGo Chocolate – 13g

Other:

Peanut butter (Kraft smooth) – 7.4g
Dips – Kraft Kids French Onion – 8.5g
Dips – Kraft Kids Creamy Corn – 6.7g
Tinned spaghetti – 5g

Drinks

Powerade – 6g

Milk* (full fat) – 4.7g
Milk (reduced fat) – 6g
Milk (skim) – 4.8g

*Children aged 4-7 years are recommended to have about 3 serves of dairy per day for calcium requirements. Limiting milk consumption to 1 cup (250mL) per day (including on cereal) is advised from a dental perspective due to its moderate sugar content. Remaining serves of dairy could be cheese, yoghurt or custard (natural or low sugar varieties).

1 serve of dairy = 40g or 2 slices cheese, 1 tub (200g) yoghurt, 1 cup (250mL) milk

Do not offer cow’s milk to children under 12 months of age, however full fat milk can be given from 12 months. Children from 1-3 years can have 6 half serves of dairy per day.

A half serve = 1 slice cheese, ½ cup milk, 100g yoghurt. Again, try to limit the frequency of milk and increase other sources of dairy.
Red Light Food and Drink

Foods to avoid (“Special occasion foods”) – these are for **special occasions**, such as parties, birthdays and holidays, depending on how strict you plan to be. They shouldn’t be considered every day foods.

If they are being consumed it’s best to eat the whole serving in one sitting, rather than multiple times per day or between meals.

Numbers in grams after the food/drink listing indicates sugar in grams per 100g/mL. The food and drink listed in the following sections is just an example. For unlisted products find the amount of sugar per 100g as described above.

**Breakfast Cereals:**

- Nutri-grain – 32g sugar per 100g
- Cheerios – 17.8g
- Coco-pops – 36.5g
- Sultana bran – 22.7g
- Toasted muesli – 19.7g
- Uncle Tobys Swiss style muesli – 17.7g
- Lowan Apricot & Almond – 16.4g
- Sunsol original muesli – 22g
- Morning Sun Apricot & Almond – 18g
- Weetbix Bites – 22g
- Light n Tasty – 17.7g
Just Right – 28.7g
Milo cereal – 27.5g
Norganic Crunchola – 18.6g
Froot Loops – 38g
Honey Weets – 23g
Nesquik – 31.5g
Lowan Cocoa Bombs – 29.8g
Uncle Tobys Nut Feast – 22.7g

Muesli Bars & snacks:

Average all fruit bars – 18g
Choc Chip Muesli Bars – 21.4g
Uncle Tobys Yoghurt Topps – strawberry – 29.7g
Uncle Tobys Fruit Fix Bars – 71.6g
Uncle Tobys Fruit Breaks – 40.8g
Roll-ups – 17.7g
LCM’s – 30g
Be Natural Nut Bars – 17g

Dairy:

Ski D’lite Honey Buzz – 15.4g
Ice Cream – 22g

Other:

Chocolate – 56g
Sweet Biscuits (variable)
Milk arrowroot – 21.3g
Tiny Teddys – 25.8g
Lollies e.g. snakes/jellies – 51g
Sultanas – 73.2g
Dried apricots – 42.4g
Dried pears – 38.6g

Drinks:

Flavoured Milk - 9g
Milo – 10g
Orange Juice (no added sugar) - 8g
Apple Juice (no added sugar) - 10.4g
Lemonade - 10.4g
Coke - 10.6g
V Energy - 10.5g
Cordial - 7g
Green Light Food Ideas

Breakfast Ideas

- Eggs
- Omelette – ham/cheese/tomato/bacon/mushroom/spinach etc.
- Frittata (can be made and then frozen into portions then defrosted as needed)
- Wholemeal toast with peanut butter or vegemite
- Plain yoghurt, with frozen or fresh berries, sliced almonds or other nuts.
- Porridge (sweeten with a few berries or sliced banana and some cinnamon sprinkled on top)
- Smoothies (see below)
- Low-sugar, wholegrain breakfast cereal with milk. Remember to keep the serving size small (1/2 cup).
  - Weetbix
  - Muesli (check the sugar content first)

Snacks and Lunches

- Nuts (raw, not roasted or salted), pepitas/sunflower seeds.
- Dips – hommus, guacamole, Baba Ghanoush, salsa
- Wholemeal bread, wholemeal pita or mountain bread with dips or hommus
- Wholemeal sandwiches or wraps with savoury fillings:
  - Cheese
  - Meats – meatballs, rissoles, ham, chicken
  - Salad vegetables etc.
- Cheese sticks or cubes.
- Carrot sticks/cucumber/snow peas/other veggies with dip or hommus
- Celery sticks filled with peanut butter or cream cheese
- Cold meats – sausage, cabanossi, ham, chicken drumsticks etc.
- Leftovers from dinner that can be eaten cold – chicken wings etc.
- Vita-Weats/Ryvita/wholegrain crackers with savoury topping.
- Plain unsweetened yoghurt (add a few berries, banana, coconut flakes or cinnamon for flavour)
- Fresh fruit slices
- Air-popped popcorn
- Hard-boiled eggs
- Baked beans
- Bean salad – e.g. 3 bean mix with salad dressing.

Dinner and Desserts
Tips for creating a balanced dinner:

1. Aim for half the volume of food to contain non-starchy vegetables. These include spinach, carrots, lettuce, green beans, broccoli, cauliflower, cucumbers, beetroot, mushrooms, capsicum, snow peas, asparagus, brussel sprouts, cabbage, celery, leeks, mushrooms, tomatoes, zucchini, sprouts and eggplant.

Vegetables don’t have to be boring. Adding stir-fry sauces, pesto, dipping sauces, dressings, mayonnaise, herbs & spices all help. Do whatever you can to increase acceptance, and keep trying.

2. Limit carbohydrates to one quarter of the dinner plate. This also includes vegetables such as potatoes, sweet potato, corn & green peas.

3. The remaining one quarter should contain lean protein – chicken, beef, pork, fish/seafood, eggs, tofu etc.

Dessert (sometimes food!):

**Nutty Berry Balls**

To make 12 balls:

- 4 prunes, pitted
- 1 cup walnuts or almonds
- ½ cup roasted unsalted macadamia nuts
- 2 tablespoons of coconut oil, melted
- ½ cup diced fresh strawberries or whole blueberries
- ½ cup unsweetened shredded coconut

Place prunes in food processor and pulse until they are a paste. Add nuts and pulse until finely chopped. Add melted coconut oil while the blade is spinning. Remove from food processor and place in a bowl with berries. Mix until combined, form into small balls and roll in coconut. Place in the fridge to set.

Dessert could also be a serving of fruit if not already consumed during the day, or some yoghurt or cheese.
Recipes

The following recipes are just an example of some dishes that are low in sugar and carbohydrates. There are a huge amount of recipe books, blogs and internet resources full of healthy & tasty dishes for everyday eating. Combined with your knowledge about sugar content and making healthy food choices, it should be an easy task to find meals that will be accepted by your family!

Vegetable Recipes

Courtesy of: http://nomnompaleo.com/recipeindex

Garlic Cauliflower ‘Mashed Potatoes’

1) Steam 1 head of cauliflower cut into florets and stems until very soft  
2) Drain and add to food processor.  
3) Add garlic, butter, salt or whatever seasoning you like  
4) Process until smooth

Cheap, easy and reheats well in the microwave the next day. Also try cauliflower, carrot and parsnip mash, or sweet potato mash. It works as a topping for Shepherd’s pie, or you can also turn any of these combinations into bubble and squeak by adding shallots, shredded cabbage, bacon and a bit of cheese.

Roasted Broccoli and Bacon

1) Cut up broccoli into florets  
2) Arrange on a baking tray with bite-sized pieces of bacon, olive oil, salt, garlic or other chosen seasoning  
3) Roast in oven 30-35 mins or until cooked.

This also works wonderfully with cauliflower.

Zucchini Lasagne
(courtesy of Chow Stalker - www.chowstalker.com/vegetables/)

As for normal lasagne (meat and/or vegetables such as pumpkin, mushrooms, sweet potato, spinach) but use strips of zucchini instead of pasta sheets.

Meat Recipes

Spinach, mushroom and beef mini burgers

Ingredients:
1 pack of frozen chopped spinach  
handful of mushrooms  
2 eggs  
1 clove garlic, chopped  
½ grated carrot  
Diced celery  
½ onion, diced  
Breadcrumbs  
500g beef mince

Defrost spinach and squeeze out excess water. Sauté onion, carrot, celery, garlic and mushrooms with a little olive oil until softened. Place in a mixing bowl with spinach, beef mince, eggs, salt, pepper and enough breadcrumbs in order to form small meatballs. Cook the mini meatballs in a frypan over medium heat. Serve hot or cold.

**Snacks**

**Blue Smoothie**  
Plain unsweetened/Greek yoghurt (from the fridge or pre-frozen into ice cube trays)  
Handful of frozen blueberries  
1 raw egg

**Yellow smoothie**  
1 banana (or ½ mango)  
Plain yoghurt  
1 raw egg  
ice cubes

**Brown Smoothie**  
1 young coconut  
1 tablespoon raw cacao/cocoa powder  
1 raw egg  
ice cubes  
tiny amount of Stevia (Natural plant-based sweetener, obtain from health food stores)

Open young coconut with a cleaver. Empty out coconut water and set aside. Scoop out coconut flesh and add to blender with ice cubes, raw cacao powder and egg. Blend with enough coconut water to desired consistency. Save left-over coconut water by freezing in ice cube trays.

**Green Smoothie** (also see Vita Mix Australia website)
½ cup pineapple (or banana/mango/apple)
½ cup frozen or fresh spinach
ice cubes
mint leaves optional

**Cheese’n’Beef Mini Frittata Muffins**

Ingredients:

Beef (or chicken or pork) mince
1 onion, diced.
Eggs
Grated cheese
Muffin tin with cupcake casings.

Sauté onion in a frypan, when softened add mince and cook until no longer pink. Set aside to cool. Whisk eggs with some salt and pepper. Fill muffin tins about halfway with cooled beef mixture and top with egg mixture to ¾ full and then grated cheese. Cook at 160 degrees for about 15 mins or until set.

You can delete the meat and just have Cheese & Egg muffins, or add sautéed vegetables such as spinach, cherry tomato, small cubes of sweet potato.

**Summary**

I hope that this will be a valuable resource in helping our future generation learn about healthy eating. If you would like any references for the material contained in this document or have any questions, please feel free to email me at rebecca.eggers@nwpd.com.au.

Thank you for reading!