

Nutrition and diabetes

Aims of the diabetes nutritional guidelines

The main aims of these guidelines are to:¹

- Achieve and maintain:
 - Blood glucose levels in the normal range or as close to normal as is safely possible
 - A lipid and lipoprotein profile that reduces the risk of vascular disease
 - Blood pressure levels in the normal range or as close to normal as is safely possible
- To prevent, or at least slow, the rate of development of the chronic complications of diabetes by modifying nutrient intake and lifestyle.
- To address individual nutrition needs, taking into account personal and cultural preferences and willingness to change.
- To maintain the pleasure of eating by only limiting food choices when indicated by scientific evidence.

Education for healthy eating

A separate kit '*Healthy eating & diabetes kit*',² has been designed for use by doctors, dietitians, practice nurses and diabetes educators and will be especially useful for people with type 2 diabetes.

Purpose of kit

1. To provide a means of making a preliminary dietary assessment.
2. To provide initial dietary advice, to help the person start making necessary changes in their diet prior to more 'in depth' dietary education later.
3. To promote continuity of dietary education between doctor, diabetes educator and dietitian.

This kit, in conjunction with the Diabetes Manual, will assist in providing information for nutrition education and can be obtained from The Queen Elizabeth Hospital Diabetes Centre. Further information may be required for people with type 1 diabetes.

When to refer to a dietitian

The nutrition management component of diabetes care includes both general nutrition education and medical nutrition therapy (MNT). General nutrition education covers a range of nutrition topics required by all people with diabetes and may be delivered by both dietitians and qualified diabetes educators. Diabetes educators who work with dietitians as part of a multidisciplinary team should provide general nutrition education as agreed between team members.

MNT builds on general nutrition education and is an individualised and comprehensive clinical intervention. MNT should only be delivered by dietitians (preferably Accredited Practising Dietitians). The Australian Diabetes Educators Association (ADEA) and the Dietitians Association of Australia (DAA) have released a joint statement that recommends that all people with diabetes should have access to a dietitian for MNT in order to achieve optimal nutritional management as part of their diabetes care.³

All people with newly diagnosed diabetes should have access to dietary education preferably with a dietitian. If resources for dietetic services are limited then the following client groups should take priority in seeing a dietitian:

- all people with type 1 diabetes requiring nutrition education / review
- all women with gestational diabetes or diabetes during pregnancy
- all people with specific life-stage nutrition requirements or who are potentially nutritionally compromised
- all people with co-morbidities impacting on their diabetes management or nutritional requirements.

A dietitian referral is indicated in the following situations:

- weight issues (ie underweight or overweight or unexplained weight gain / loss)
- frequent hypo or hyper glycaemia
- inadequate blood glucose management
- elevated blood lipids
- elevated blood pressure
- change in diabetes management (ie oral hypoglycaemic agents or insulin therapy)
- commencement of insulin therapy
- commencement of insulin pump therapy
- other nutritional issues eg renal nutrition modifications, coeliac disease, food allergy / intolerance.

If a health professional is unsure of nutrition referral criteria or referral process, they should discuss with the dietitian.

Include a variety of foods each day

Healthy eating is the cornerstone for diabetes management. There is no “special diet” for diabetes. A healthy eating plan, based on a variety of foods from the five food groups, is recommended for the whole population. We should ‘eat most’ of wholegrain breads and cereals, followed by vegetables and legumes and fruit. Milk and milk products, meat and meat alternatives should be included in smaller amounts each day. The following table outlines good food choices and approximate serves required from each food group (for adults):

Healthy Food Choices from the Five Food Groups	
Breads and Cereals	
✓ 4-5 serves daily	1 serve = 1 slice bread, 1/2 roll, 1 muffin, 1 crumpet, 3 large crispbreads,
✓ preferably choose wholegrain, high fibre varieties	breakfast cereals, eg 1/4 cup raw oats, 3/4 cup cooked porridge, 1 1/2 Weetbix, 1 cup Puffed Wheat, 12 mini-wheats, 3/4 cup Guardian, 1/3 cup All-Bran, 1/4 cup rice bran, oat bran, or barley bran. 1/2 cup cooked noodles, spaghetti or macaroni, 1/2 cup raw barley or 1/3 cup cooked rice (choose Basmati or Doongara rice), 1/3 cup bulgur (cracked wheat)
Vegetables	
✓ Aim for 5 serves each day	1 serve =
Starchy eat in moderation, 1-2 serves daily	1 medium potato, 1/2 cup sweet potato, 1/3 cup sweet corn (or 1 cob), 1/2 cup cooked (dried) beans, peas and lentils
Non-starchy eat plenty fresh, frozen and canned varieties are suitable choose the low salt tinned varieties	Serves do not apply for non-starchy vegetables – they are unrestricted asparagus beetroot broccoli cabbage capsicum carrot cauliflower celery cucumber eggplant green beans lettuce mushrooms onions peas pumpkin spinach tomato turnip zucchini
Fruit	
✓ eat in moderation, 2-3 serves, spaced over the day	Any fruits are suitable 1 serve = 1 apple, 2 apricots, 1 banana, 1 cup berries, 15-20 grapes, 1 orange, 1 peach, 1 pear, 2 slices pineapple, 1 tablespoon sultanas, 6 dried apricot halves, 3/4 cup tinned fruit drained, 120ml unsweetened fruit juice (limit to 1 glass a day)
✓ fresh, unsweetened canned or dried (not glace) varieties are suitable	
Milk products	
✓ 3-4 serves daily	1 serve = 300ml milk – fresh, evaporated, dried, UHT, 200g yoghurt – natural or diet,
✓ preferably use low fat or skim varieties	300ml buttermilk, soy milk (with added calcium) 40g hard cheese, 100g ricotta or cottage cheese
Protein foods	
✓ 1 serve daily	1 serve = 120g lean meats such as beef, lamb, pork, rabbit, kangaroo
✓ use non-fat cooking methods eg baking on a rack, boiling, grilling, micro-waving, steaming	100g poultry without skin – chicken, turkey 80-120g fresh or canned fish, seafood 1/2 cup cooked (dried) peas, beans and lentils 2 small eggs
Fat – a small amount	
Use small amounts only, around 1 tablespoon a day. Limit frying.	Best choices are polyunsaturated or mono-unsaturated margarines and oils eg sunflower, sunola, macadamia, canola, olive. Avocados, nuts and seeds are high in good fats; use in small amounts. Avoid or limit saturated and trans fats eg butter, lard, dripping, cream, coconut milk/cream, palm oil (used to make many commercial biscuits / pastries / chocolates).

Importance of weight management

Weight management is an important component of a healthy lifestyle. Being overweight or obese increases the risk of developing type 2 diabetes. Excess weight is associated with insulin resistance (and hence poorer diabetes control), increased risk of cardiovascular disease, stroke, joint problems and some types of cancer. Although being overweight or obese is not a risk factor for type 1 diabetes, a healthy weight is encouraged for all Australians.

If overweight or obese, even a modest weight loss of 5 to 10% of body weight can improve glycaemic control in type 2 diabetes, lipids, blood pressure and quality of life. A healthy weight is determined by calculating the Body Mass Index (BMI)*. However, it may be more useful (and more realistic) to set small but specific weight loss goals with the person. For example, for someone with an overall weight loss goal of 10kg, you might encourage smaller monthly goals of 1kg for the next 10 months.

Waist circumference measurements are another useful tool for assessing risk of chronic disease. Excess weight around the waist / abdomen is associated with insulin resistance and a higher risk for chronic disease. A waist measurement of greater than 94cm for men or 80cm for women is an indicator of the internal fat deposits, which coat the heart, kidneys, liver and pancreas. Measurements of more than 102cms for men and 88cm for women greatly increase the risk of chronic disease.

Use the following tips for taking waist measurements:

- measure directly against the skin
- ask the person to breathe out normally
- make sure the tape is snug without compressing the skin
- measure halfway between the lowest rib and the top of the hipbone, roughly in line with the belly button.

Refer to the Australian Better Health Initiative 'Measure-Up' campaign website <http://www.measureup.gov.au>.

Weight loss requires either a reduction in energy (calorie / kilojoule) intake (through changes in eating habits) or an increase in energy output (by increasing physical activity), or both. A Cochrane Review found that people who combined exercise with dietary change lost more weight compared to those who used diet alone.⁴ Furthermore, exercise is associated with improved cardiovascular disease risk factors even if no weight is lost.⁵ "Eat less, walk more" is an important and simple message for a healthy lifestyle.

* Body Mass Index (BMI) is calculated as weight (kg) divided by height (m)². Ideal range = 20–24.9kgm²; underweight = <20kgm²; overweight = 25–29.9kgm²; obese class 1 = 30–34.9kgm²; obese class 2 = 35–39.9kgm²; obese class 3 >40kgm².

What is carbohydrate?

Carbohydrate is one of the main nutrients in foods. Carbohydrate comes from foods containing sugars or starches, eg:

- breads, cereals, grains
- starchy vegetables eg potato, sweet potato, corn
- legumes
- fruit (contains a sugar called fructose)
- milk and yoghurt (contains lactose, a milk sugar)
- foods with added sugars such as table sugar, soft drinks, cakes, biscuits, lollies (these are higher energy, non-nutritional choices and should be limited to occasionally).

All carbohydrate foods are eventually digested to glucose. The glucose is absorbed into the bloodstream and is the body's main source of energy. Carbohydrate should contribute approximately 50% of the total energy intake (range from 45% to 65%). In type 2 diabetes, it is usually recommended that carbohydrate intake be evenly distributed across the day, to help regulate blood glucose levels. For people using rapid acting insulin, their insulin doses should be matched to carbohydrate intake. For people using fixed daily insulin doses, carbohydrate intake should be kept consistent on a day-to-day basis (specific advice can be provided by a dietitian).

Carbohydrate foods that can assist in improving blood glucose levels are those that are low in fat, high in fibre and are broken down slowly to glucose (low Glycaemic Index, GI). Examples of such foods are wholegrain breads and cereals, legumes (eg baked beans), most fruit, low fat milk and low fat yoghurt. See next section for more information on GI.

The glycaemic index

The Glycaemic Index (GI) is a ranking of carbohydrate foods from 0–100, according to the rate at which the carbohydrate in the food is digested and absorbed into the bloodstream as glucose.⁶ Carbohydrate foods that break down slowly release glucose gradually into the bloodstream and have a low GI. Examples of low GI carbohydrate foods are most wholegrain breads (eg Tip Top 9 Grain and Burgen Mixed Grain), legumes, oats, milk and most fruit. Carbohydrate foods that break down quickly produce a faster and higher rise in blood glucose levels and have a high GI. Examples of high GI carbohydrate foods are regular sliced white bread, Rice Bubbles and jellybeans.

Including low GI foods in the diet may have a number of benefits:

- they can assist with the management of diabetes as they may produce lower blood glucose levels
- they can help to improve satiety (ie make you feel fuller for longer) thereby assisting in appetite control
- they may help to reduce the incidence of hypoglycaemia for those on insulin or sulphonylurea medications.

However, GI alone should not determine food choices.

Other factors that need to be considered include:

- the overall nutrient content of the food, especially the fat content of foods (eg chocolate has a low GI but is high in fat)
- the amount of food eaten (eg a large amount of food that is low in GI will still likely have a large impact on BGLs).

At least one low GI food per meal is recommended. See table 1.

Table 1

GI of Various Foods		
Low GI (55 and under)	Medium GI (56-69)	High GI (70 and above)
<p>Breakfast Cereals Rice bran & oat bran, Kelloggs All-Bran, Kelloggs Guardian, porridge (made from rolled oats), Burgen Muesli, Kelloggs Sustain, Kelloggs Komplete</p> <p>Breads & cereals Many whole grain/multi grain breads (such as Tip Top 9 Grain, Burgen Mixed Grain, Bakers Delight Cape Seed), Bakers Delight Lo GI white bread, Wonder White Low GI bread, Buttercup Fruit and Spice loaf, Tip Top Fruit Loaf, pearl barley, pasta (durum wheat), fresh rice noodles (boiled), Maggi 2 minute instant noodles (low fat), cracked wheat (Bulgur), buckwheat, Doongara Clever Rice, Long grain white Mahatma rice, semolina</p> <p>Biscuits Ryvita crispbread (Pumpkin Seeds and Oats/ Sunflower Seeds and Oats), Arnotts Snack Right Fruit Slice</p> <p>Vegetables Sweet corn, sweet potato (baked)</p> <p>Legumes & Pulses Lentils, red kidney beans, butter beans, cannellini beans, split peas, chick peas, baked beans</p> <p>Dairy Products Low fat varieties of yoghurt, milk, soy milk, custard, Fruche</p> <p>Fruit grapefruit, dried apricots & apples, pears, apples, plums, peaches, banana (average), oranges, grapes, prunes pitted, mango, kiwifruit, nectarine, strawberries</p> <p>Juices Fruit juices (apple, orange, pineapple, grapefruit)</p>	<p>Breakfast Cereals Sanitarium Weet-Bix, Uncle Tobys Vita Brits, Kelloggs Just Right, Kelloggs Mini Wheats (plain)</p> <p>Breads & Cereals Rye wholemeal & light rye bread, wholemeal bread, pita bread (white), Bakers Delight Apricot Delight Log, crumpet, croissant*, Basmati white rice (boiled), Sunrice Arborio risotto rice (boiled), wild rice, Sunrice medium grain brown rice, buckwheat noodles, dried rice noodles boiled, gnocchi cooked, couscous, polenta</p> <p>Biscuits Ryvita crispbread (Original Rye/ Sesame Rye), Shredded Wheatmeal, Milk Arrowroot biscuits</p> <p>Dairy Products Ice cream* (regular)</p> <p>Fruit Sultanas, pineapple, rockmelon, apricots, cherries (dark), pawpaw, raisins</p> <p>Sugars Sugar (sucrose)</p>	<p>Breakfast Cereals Sanitarium Puffed wheat, Kelloggs Rice Bubbles, Kelloggs Sultana Bran, Kelloggs Bran Flakes, Kelloggs Cornflakes, Kelloggs Blackcurrant Mini Wheats, Kelloggs Coco Pops, Shredded Wheat</p> <p>Breads & Cereals Many types of white bread (eg Tip Top Sunblest white bread, Bakers Delight Tiger Loaf, regular white sliced bread), English muffin, bagel (white), baguette, Jasmine rice, glutinous rice, tapioca</p> <p>Biscuits Water crackers, Sao (plain)* Morning Coffee biscuits, Ric growers Puffed Rice Cakes</p> <p>Vegetables Potatoes, broad beans</p> <p>Fruit Watermelon, lychees (canned in syrup, drained)</p> <p>Drinks Sports drinks (eg Gatorade), Lucozade</p> <p>Sugars glucose, jelly beans</p>

* These are foods high in fat. Use them occasionally.

For more information, see <http://www.glycemicindex.com>.

Carbohydrate serves / exchanges

The recommended intake of carbohydrate foods will vary from person to person; depending on many factors such as weight, height, age, exercise / activity levels, diabetes medications and insulin. A dietitian will be able to advise on how much is individually appropriate. A general recommendation for most adults is 9–15 serves of carbohydrate foods spread evenly over the day, depending on activity levels. People with type 1 diabetes will need more specific guidelines on carbohydrate intake and are advised to seek individualised dietetic input. One serve of carbohydrate contains approximately 15 grams of carbohydrate (another word for a carbohydrate serve is an exchange).

Example serves (exchanges) of carbohydrate foods are listed below.

One carbohydrate serve (exchange) is equal to:

Amount	Food
	BREADS AND CEREALS
1 slice	Bread eg wholegrain
1/2 roll	Bread roll (medium)
3/4 cup	Cooked porridge (use 1/4 cup raw oats)
1 1/2 cup	Good Start, Weet-Bix, Vitabrits, Bran Bix, Lite Bix
1/4 cup	Muesli
1/2 – 3/4 cup	Other cereals (eg Weeties, Sustain, Bran Flakes)
1/3 cup	Cooked rice eg Basmati, Doongara
1/2 cup	Cooked pasta, noodles
3 large	Crispbread (preferably wholegrain), eg Ryvita, Cruskits, Vita Wheats, rice cakes
1 1/2 tblspns (dry)	Barley, millet, cracked wheat, burghul
	STARCHY VEGETABLES
1 medium	Potato
1/2 cup	Mashed potato or sweet potato
1/3 cup	Sweetcorn or 1/2 cob of corn
1/2 cup	Cooked lentils or legumes eg Baked Beans
	FRUIT
1 medium	Apple, orange, pear, peach, grapefruit, nectarine, banana
2-3 small	Plums, apricots, mandarins, kiwi fruit, dates, prunes
1 cup	Strawberries, blackberries
1 tablespoon	Sultanas
15 - 20	Grapes
	MILK PRODUCTS
300ml	Skim or low fat milk
300ml	Reduced fat soy milk (preferably with added calcium)
200g	Low fat, natural yoghurt or artificially sweetened diet yoghurt
100g	Light fruit yogurt

Dietitians can usually provide more comprehensive exchange lists. Carbohydrate counters are also available at many bookstores.

What about fat?

Fats in the diet are essential for good health. However too much fat in the diet can contribute to weight gain and saturated fat can increase the risk of other health problems (such as heart disease). Dietary fats have over double the energy (calories / kilojoules) content of carbohydrate and protein. In addition, dietary fat is readily converted to and stored as body fat.

Australians consume too much fat with many having over 40% of total energy intake. An intake of 30% or less is recommended, with a focus on lowering saturated fat intake.

Saturated fat is often referred to as the 'bad' fat as it raises blood LDL cholesterol levels. Saturated fat mainly comes from animal products and some plant oils (mainly palm and coconut oil) (refer to table below). Unsaturated fats (either poly or mono-unsaturated) are known as 'good' fats as they may help to improve blood cholesterol levels if they replace saturated fats in the diet.

The following table indicates different sources of fat.

Saturated	Monounsaturated	Polyunsaturated
<p>Fats</p> <ul style="list-style-type: none"> * Butter, lard, Copha, cooking margarine * Ghee, dripping, dairy blends, vegetable shortening * Cream, sour cream <p>Meat/meat products</p> <ul style="list-style-type: none"> * Fatty meat (untrimmed chops, poultry skin, chicken wings, fatty mince) * Smallgoods, sausages, saveloys, fritz, salami, bacon, mettwurst * Full fat dairy products (full cream milk, cheese, cream cheese, full fat yoghurt, regular ice cream) * Pate <p>Plant sources</p> <ul style="list-style-type: none"> * Coconut oil/cream/milk * Palm oil (used commercially in fast food/take away and cakes/biscuits) * Toasted breakfast cereal eg muesli <p>Takeaway foods</p> <ul style="list-style-type: none"> * Commercial cakes/pastries/biscuits * Deep fried or battered foods * Pies, pasties, sausage rolls * Pastries – shortcrust and puff pastry * Potato crisps, hot chips 	<p>Oils/Margarines</p> <ul style="list-style-type: none"> ✓ Canola ✓ Olive ✓ Macadamia ✓ Sunola ✓ Peanut <p>Vegetables</p> <ul style="list-style-type: none"> ✓ Avocado ✓ Olives <p>Nuts & Seeds</p> <ul style="list-style-type: none"> ✓ Almonds ✓ Peanuts ✓ Cashews ✓ Hazel nuts ✓ Macadamia ✓ Pecans <p>Spreads</p> <ul style="list-style-type: none"> ✓ Peanut paste ✓ Almond spread 	<p>Oils/Margarines</p> <ul style="list-style-type: none"> ✓ Sunflower, safflower ✓ Corn ✓ Soybean, sesame ✓ Cottonseed ✓ Grapeseed <p>Nuts & Seeds</p> <ul style="list-style-type: none"> ✓ Walnuts ✓ Pine nuts ✓ Brazil nuts ✓ Sesame seeds ✓ Sunflower seeds ✓ Linseeds <p>Spreads</p> <ul style="list-style-type: none"> ✓ Tahini <p>Fish/Seafood</p> <ul style="list-style-type: none"> ✓ (choose fresh fish or canned in water/brine) ✓ sardines, mackerel ✓ Salmon, tuna, mullet ✓ Calamari ✓ Gem fish ✓ Blue eye cod

Trans fats are another type of fat that have a similar effect on blood cholesterol levels as saturated fats and should be limited. Trans fats are found in many high fat animal products (such as fatty meats, full cream dairy) as well as some types of margarine. Trans fats can form in the processing of a liquid oil into a solid (ie margarine processing). Most margarines in Australia are now low in trans fats. Look for margarines containing less than 1% trans fat (less than 1 gram of trans fat per 100 grams).

The following fat checklist may be useful.

✗ Avoid or Limit These Foods	✓ Suitable Alternatives
<p style="text-align: center;">✗ High in Fat</p> <p>Mayonnaise, oily dressings, cream sauces, fatty gravies, sour cream.</p> <p>Fat on meat, chicken skin, fatty meats - eg sausages, fritz, bacon, salami, deep-fried foods, pies, pasties.</p> <p>Snack foods - eg nuts, crisps, hot chips, prawn crackers.</p> <p>Large amounts of margarine, butter, oil, cream, peanut butter, dripping, lard, ghee, coconut cream.</p> <p>Full fat (regular) dairy products eg full cream milk and cheese, full cream yoghurt.</p>	<p style="text-align: center;">✓ Alternatives</p> <p>Low joule dressings and light mayonnaise, vinegar, lemon juice, low joule Gravox, plain low fat yoghurt, soy sauce, fish sauces and stock.</p> <p>Trim fat from meat, remove chicken skin, use lean cuts of meat, cook without fat or use an oil spray.</p> <p>Limit quantity of snacks. Try crisp, raw vegetables, fruit, pretzels, or plain popcorn instead.</p> <p>Limit to 1 tablespoon per day of added fats, preferably poly or monounsaturated margarine or oil.</p> <p>Use reduced or low fat cheese.</p>

Protein

Protein is a nutrient essential for the body's growth and repair, as well as having other important functions in the body. Foods that are rich in protein include cheese, eggs, fish / seafood, meat and poultry. These foods do not contain carbohydrate and do not directly affect blood glucose levels. Milk and yoghurt are rich in both protein and carbohydrate, and will affect blood glucose levels. These foods need to be considered in the daily carbohydrate requirements.

Protein foods may be high in fat and saturated fat. Small serves of low fat protein foods should be included each day, for example skinless chicken, lean beef or meat trimmed of fat, fish, boiled or poached eggs and low fat dairy products. Legumes and pulses are also good sources of protein. Refer to 'Good Food Choices' table on page 3 of this section for serve sizes.

A word about fibre

Dietary fibre is the part of plant food that cannot be digested by the body. Fibre is important for good health and has many important roles:

- prevention and treatment of constipation
- contribution to weight management by creating a feeling of fullness in the gut
- soluble fibre (found in fruit, oats, legumes) may help to reduce blood cholesterol
- soluble fibre can slow down digestion and may help to manage blood glucose levels.

Foods that are high in fibre include:

- wholegrain breads and cereals
- oats, porridge and brans
- fruit and vegetables (especially with edible skins)
- legumes, such as lentils, red kidney beans and baked beans
- nuts and seeds.

How much salt do we need?

Salt consists of sodium and chloride. Excess sodium can cause the body to retain fluid, which may lead to high blood pressure, heart disease and kidney disease. The amount of sodium needed for body functions is small and is provided by the sodium that occurs naturally in foods such as meat, fish, milk, eggs and vegetables. The recommended intake for sodium is 1600mg/day to reduce risk of chronic disease or an upper limit of 2300mg/day for adults. The average Australian consumes up to 4600mg/day, with most of the salt contribution from processed foods. Remember that there is a period of adjustment in taste when reducing salt and so be patient.

Ways to reduce salt:

- avoid adding salt to cooking and at the table (create flavour with garlic, onion, spices and herbs)
- choose 'No Added Salt', 'Low Salt' or 'Salt Reduced' products (remember these still contain some sodium)
- limit commercially prepared food, takeaways and avoid salty snack foods (eg crisps and salted nuts)
- steam or microwave your vegetables without adding salt
- cook pasta, rice and potatoes without salt
- check food labels for lower salt products (less than 120mg sodium per 100g is a low salt product; up to 400mg sodium per 100g is a moderate salt product).

Alcohol and diabetes

Alcohol has an accepted place in our society today and can be a pleasant indulgence if enjoyed in moderation. However, excessive drinking of alcohol is harmful and can lead to health and social problems.

For people with diabetes, alcohol also needs to be limited because:

- Alcohol is high in kilojoules / calories and can contribute to excess weight. Achieving a healthy weight is very important in managing diabetes.
- Alcohol can react with many medications, including some diabetes tablets and insulin, to cause unpleasant side effects.
- Alcohol can increase the risk of hypoglycaemia (low blood glucose levels) for people on insulin therapy or taking sulphonylurea medications. The 'hypo' can be delayed.
- If the alcoholic drink contains carbohydrate, eg regular beer, diet beer, sweet wines and liqueurs, the blood glucose level can rise too high (hyperglycaemia).

Guidelines for sensible drinking

1. The Australian Alcohol Guidelines recommend no more than two standard drinks on any day.⁷

A standard drink is:

- 285ml schooner of regular beer
- 425ml light beer
- 30ml nip of spirits
- 100ml wine
- 60ml glass of fortified wine (eg sherry)

2. Drinking without eating can increase the risk of 'hypo' for people on insulin or sulphonylurea medications. It is recommended to have some carbohydrate food such as wholegrain bread, crackers or the usual meal when drinking alcohol and to keep a closer check on blood glucose levels.
3. Lower calorie choices are:
 - dry wines, eg riesling, dry sherry, dry reds, brut champagnes
 - spirits mixed with water or diet drinks, eg whisky, brandy, gin, rum, vodka, dry vermouth
 - light beer.

Cooking with alcohol

Dry wines and spirits can be used in cooking. The heat will evaporate most of the alcohol, leaving the flavour behind.

Special considerations

Nutrition standards in your health service

As a health service it is important to demonstrate to colleagues and the wider community healthy options for food provision in your service. To assist health services in providing nutritionally appropriate options for events (eg community education, meetings, focus groups, open days) the SA Health has developed a policy on 'Healthy food and drink choices for staff and visitors in SA health services'.⁸ See <http://www.publications.health.sa.gov.au/fs/22/>.

Pregnancy

Diabetes in pregnancy can be gestational diabetes or pre-existing type 1 or type 2 diabetes (see *Pregnancy* – Section 13). General healthy eating guidelines apply for women with diabetes who are pregnant or planning pregnancy. Adequate glycaemic control and a healthy weight can optimise outcomes for both the mother and baby. Pre-pregnancy medical counselling and review for women with diabetes should occur.

Women planning to become pregnant should take a folic acid supplement of 500mcg for at least one month before pregnancy and the for the first three months, to reduce the risk of neural tube defects in the child. Pregnant women with pre-existing type 1 diabetes or type 2 diabetes have higher folic acid supplement requirements; 5mg supplementation per day is recommended.

The management of type 1 diabetes in pregnancy is challenging. Prompt referral to a specialist dietitian is essential.

Pregnant women with diabetes mellitus need to pay particular attention to the amount and type of carbohydrate that they eat. Usually women are advised to eat several small meals throughout the day. Every meal and snack should contain carbohydrate and should be eaten at consistent intervals each day. Low glycaemic index carbohydrates can help to manage blood glucose levels.

The aims of healthy eating during pregnancy are to:

1. achieve or maintain normal blood glucose levels (or as close to normal as possible)
2. provide a healthy eating plan which meets the increased nutritional demands of pregnancy
3. achieve an appropriate weight gain during the pregnancy.

Post-pregnancy the mother should be encouraged to breastfeed (if possible). Women with gestational diabetes should be followed up post-partum to assess for type 2 diabetes.

A dietitian can provide specific advice and support for women with diabetes throughout their pregnancy and beyond.

Hospitalisation and convalescence

During hospital admissions some people with diabetes have altered nutritional needs as a result of their presenting illness, for example, someone with type 1 diabetes undergoing major surgery might have special nutritional needs as a result of their operation. Others may be chronically unwell, for example, may suffer from chronic renal failure or chronic obstructive airways disease. In these cases the dietary recommendations are determined by assessing the total clinical situation and not only the diabetes. A dietitian referral would be appropriate.

Nutrition for children with diabetes

Most of the diabetes that occurs in children is type 1 diabetes. However, the incidence of type 2 diabetes in children and adolescents is growing. Children need to eat foods that meet their nutritional needs for growth and development.

Children with type 2 diabetes are often overweight or obese. A healthy eating plan that limits fats (particularly saturated fats) and limits foods / drinks high in added sugars is recommended. Regular physical activity is also important. Support and advice that encourages healthy lifestyle changes should involve the whole family.

Similarly, although children with type 1 diabetes do not have to follow a special 'diabetes diet', they may need to pay more attention to when they eat and how much. Insulin needs to be balanced with carbohydrate intake and activity levels to help manage blood glucose levels.

Referral to a dietitian is essential for children with diabetes and their families.

Summary

1. General healthy eating guidelines apply for people with and without diabetes.
2. A dietitian can provide advice on developing individualised nutrition plans where a person has special requirements.
3. For people using rapid acting insulin their insulin doses should be matched to carbohydrate intake.
4. For type 2 diabetes, regular, small to moderate sized meals including carbohydrate should be spread over the day. Meals should be based on wholegrain breads and cereals, vegetables, legumes and fruit with smaller serves of lean meats and dairy foods. Foods with a lower glycaemic index can help to regulate blood glucose levels.
5. Exercise should be encouraged daily. For people on insulin therapy, adjustments to insulin may be required for exercise (see *Healthy lifestyle* – Section 9).
6. Healthy eating is the cornerstone for type 2 diabetes management.

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