

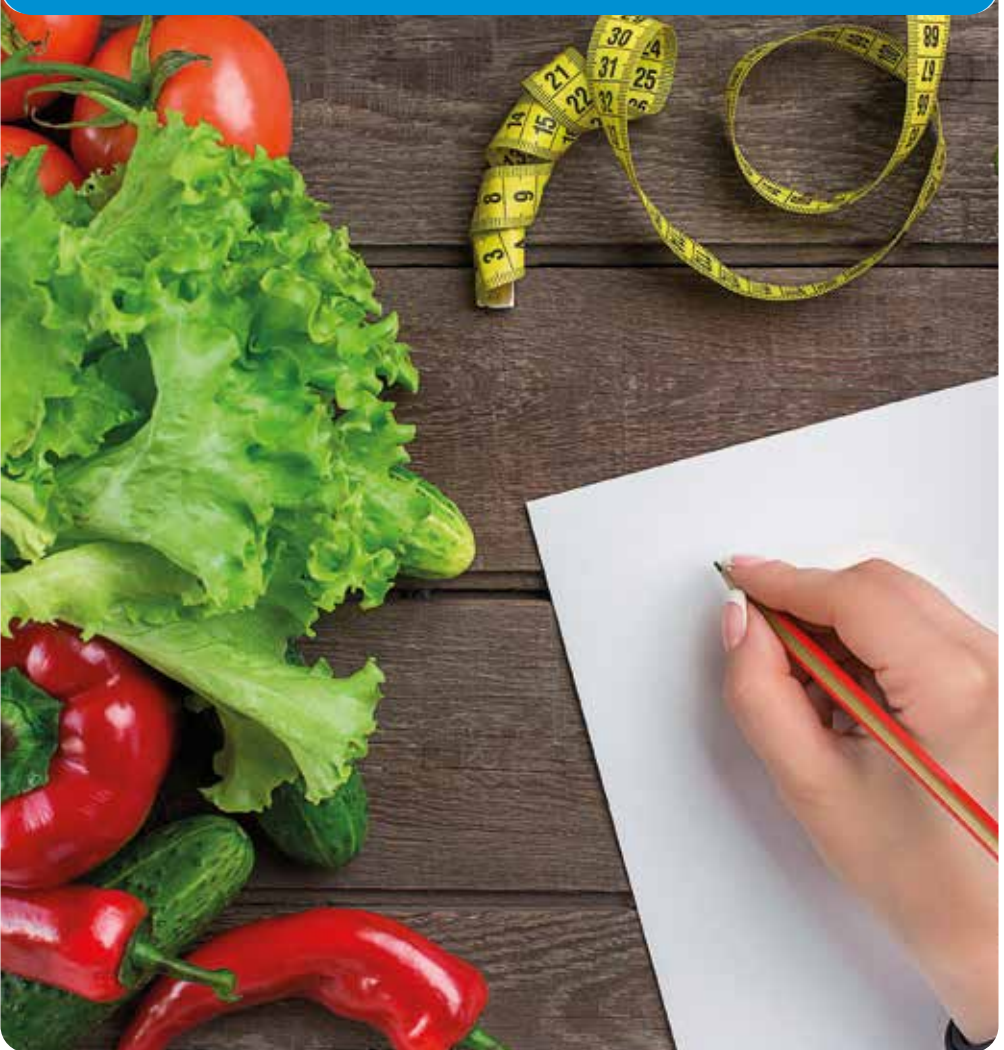
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Sherwood Forest Hospitals
NHS Foundation Trust

A guide to carbohydrate counting

Information for patients



What is carbohydrate counting?

Carbohydrate counting involves calculating the amount of carbohydrate in the food you eat or drink and then matching the amount of insulin that you need for that carbohydrate.

At first, it will require some time and motivation as you learn how to count the carbohydrates. It also requires regular blood glucose testing and reviewing your levels, but in the long term the benefits include:

- Eating as little or as much as you wish without worrying about high and low blood glucose levels.
- Providing more flexibility over when you eat want to eat.
- Enjoying a wider variety of foods.
- Being able to enjoy eating out.
- Improving self-management of your diabetes.

Although it is not entirely necessary, it is still advisable to eat regular meals (about three meals a day) to help regulate your energy levels. This will not only help with your diabetes control but also with your general health and wellbeing.

Carbohydrate counting is not about healthy eating. It is, however, advisable to aim to achieve a healthy balanced diet and keep sugary foods and drinks to a minimum. Consuming these in high amounts can make it more difficult to control your blood glucose levels and contribute to weight gain and dental issues.

A balanced diet

The 'eatwell' plate below shows the five main food groups.

It suggests the proportion that each of these food groups should contribute to what is considered a healthy diet.

Note that carbohydrate can be found in most of these food groups.



Steps to carbohydrate counting:

1. Identify carbohydrate in food (see page four).
2. Calculate amount of carbohydrate in food.
3. Work out amount of insulin required to cover carbohydrate portion (know your insulin:carb ratio).
4. Decide when to inject insulin (before, during, after meal) – based on eating scenario and meal type.

What is carbohydrate?

Carbohydrate (CHO) is the main type of nutrient that effects your blood glucose level. Most foods contain a mixture of carbohydrates, fats and proteins which are all nutrients that provide us with energy. Carbohydrates break down into glucose, which is absorbed into the blood stream and transported to body cells where it is converted into energy. In diabetes, the more CHO you eat, the higher your blood glucose level will go if not matched with the right amount of insulin.

What foods contain carbohydrates?

- **Cereal starches:** Porridge oats, breakfast cereals, bread, pasta, rice, couscous, crackers, crisp breads.
- **Vegetable starches:** Potatoes, parsnips, plantain, garden peas, sweetcorn, squash, baked beans, mixed beans, lentils, and chickpeas.
- **Foods containing natural sugars:** Fructose – all fruit (fresh, tinned, dried, frozen), fruit juice, lactose – milk and dairy products for example milk, yoghurt, custard.
- **Foods high in added sugar:** Sweets, chocolate, ice cream, cakes, biscuits, syrups, jams, honey, puddings, sugary drinks, snack foods including crisps and cereal bars.
- **Other:** Flour, pastries, Yorkshire puddings, frozen meals, processed meat/fish for example breadcrumb/battered, and food with added wheat for example sausages, sauces and gravies.

Foods with little or no carbohydrate

- **Fats:** Margarine, butter, oil and cream, some salad dressings.
- **Protein:** Plain meats, fish, chicken, eggs, cheese, nuts, soya and tofu.
- **Salad:** And most vegetables apart from those mentioned on page four.
- **Drinks:** Sugar free and diet drinks, no added sugar squashes, tea and coffee (without milk).

Glycaemic Index

Different foods raise blood glucose levels at different rates. This is described as the glycaemic index (GI). Foods with a lower GI raise blood glucose more slowly. Many things can affect the GI and therefore the speed at which a food or drink increases your blood glucose level:

- Foods high in soluble fibre for example vegetables, beans, pulses, peas and lentils are digested slowly and therefore take longer to increase your blood glucose level.
- A meal high in fat will take longer to be digested.
- A meal with large protein content (for example English breakfast) will take longer to be digested.

BUT

It is the **quantity** rather than the type of carbohydrate that is important when working out how much insulin you should give, however, the timing of your insulin may have to change.

Calculate the amount of carbohydrate in food

Initially calculating the carbohydrate in your food can be time consuming but we generally eat similar foods and portions each day. Once you have identified the carbohydrate portion in particular foods, you will remember the amounts and will then only have to count foods you consume less often.

It will be useful to record the carbohydrate content of the foods you eat using a carbohydrate/food diary. There are a range of methods for calculating carbohydrate in food and drinks:

- Using carbohydrate reference tables/books.
- Reading food labels.
- Weighing foods.
- Recipes.
- Picture books.
- Using household or handy measures for example cups, spoons, fist size.
- Carbohydrate and calorie counting books and apps
- Looking on the internet for product information.

See '**useful resource**' list on page fifteen.

Always keep the following 'tools' together in the kitchen where you will dish your food out:

- Digital scales
- Pen
- Calculator
- Carbohydrate reference table.

Using carbohydrate reference tables

You will be provided with a booklet containing lists of popular foods and drinks with a typical serving or serving weight in grams (g). They will suggest the carbohydrate (CHO) value in grams (g) in this serving.

This is a useful guide to find the carbohydrate value of the food products. You can also use the carbohydrate (CHO) per 100g column to calculate the CHO for a particular portion you wish to eat.

Example 1

If you have 2 Wheat biscuits with 150ml milk, how much CHO will you eat?

Wheat biscuit $2 \times 13\text{g} = 26\text{g}$

Cows milk 150ml = 7g

$26\text{g} + 7\text{g} = 33\text{g}$

You will be provided with an individual insulin:CHO ratio which is the amount of insulin you need to cover the CHO you eat.

Food type	Typical portion	Weight of portion (g)	CHO(g)	CHO/ 100g
Wheat biscuit	1 biscuit	20g	13g	69g
Milk	Small glass	150g	7g	5g

Example 2

A common insulin to carb ratio is 1unit:10g carbohydrate.

Therefore for every 10g of CHO, 1 unit of insulin is required.

Total insulin required for the meal = 3.3 units. If on a half unit pen then 3.5 units could be given.

Weighing food

Weighing foods give you a more accurate measure to work out the carbohydrate content. A set of digital kitchen scales will be a useful addition to your diabetes 'tool box'.

This might seem like a time consuming task but once you have taken initial weights of your commonly consumed items, you can record the information somewhere safe to refer back to which will save time in the long run.

Use this calculation to find the amount of carbohydrate (CHO) in your portion size:

$$\frac{\text{CHO/100g}}{100} \times \text{your portion size (g)}$$

Example:

Your portion of cereal weighs **56g**. Work out the amount of CHO in your portion.

NUTRITION INFORMATION:

Servings per package: Approx. 16
Serving size: 30g

	Quantity Per serving	Quantity Per 30g serving Plus 2/3 cup (170ml) skim milk	% Daily Intake*	Quantity Per 100g
Energy	459kJ (110Cal)	832kJ (199Cal)	5%	1530kJ (366Cal)
Protein	2.3g	9.3g	5%	7.6g
Fat, total	0.1g	2.9g	0.1%	0.4g
- saturated	0.1g	2.8g	0%	0.1g
Carbohydrate	23.1g	32.6g	7%	77.0g
- sugars	2.7g	12.2g	3%	9.0g
Sodium	177mg	269mg	8%	590mg

$$\text{CHO/100g} = 77\text{g}$$

$$77\text{g} \div 100 \times 56$$

$$= 43\text{g CHO}$$

Be aware of serving size information which combines the food with additional carbohydrate containing products (for example cereal + milk). See the example on page eight. Please check if the serving size is listed as raw/ cooked weight in the instance of foods like porridge oats/ ready brek/ pasta/ rice/ any other starches that require cooking.

Weigh your portion of cereal and calculate using per 100g information then weigh your milk separately and add both CHO values together for more accuracy.

Other tips

If values listed are for cooked products, such as pasta, cook the product according to instructions on the packet, i.e. check the recommended time.

Food manufacturers may change their recipe and therefore composition of food may change. It is important to keep up to date and check your labels.

Use cups/spoons/bowls to make life easier, for example work out the amount of CHO in a cup of cooked rice. Next time you have the same meal, use the same cup to dish up your rice.

It is handy to make your own food lists with your usual portion size and the CHO content as stated previously.

Be aware of using the right value, for example for either cooked or dry weight foods. Remember rice and pasta absorbs water when cooked, therefore the portion will weigh more once cooked. On the other hand a baked potato loses water and therefore shrinks in size after cooking.

Reading food labels

Food labels provide you with the amount of carbohydrate in the product. All products provide nutritional information per 100g of the product. Some will also provide a second column displaying nutritional content in the recommended serving size of the product.






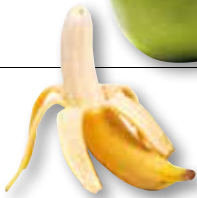


Nutrition				
Typical Value	100g contains	Each slice (typically 44g) contains	% RI *	RI* for an average adult
Energy	985kj 235kcal	435kj 105kcal	5%	8400kj 2000kcal
Fat	1.5g	0.7g	1%	70g
Of which saturates	0.3g	0.1g	1%	20g
Carbohydrate	45.5g	20.0g		
Of which sugars	3.8g	1.7g	2%	90g
Fibre	2.8g	1.2g	4%	30g
Protein	7.7g	3.4g		
Salt	1.0g	0.4g	7%	6g
This pack contains 16 servings *Reference intake of average adult (8400kj/2000kcal)				

For carbohydrate counting you use total carbohydrate which includes all added, natural sugars and starch as all of these will break down into glucose. If you decide to consume more or less than the serving size provided, you can calculate the amount of carbohydrate in your portion using the 100g information or the total weight of the whole product which is usually displayed. You may have to weigh your portion to work this out.

Example: Four slices of bread will contain $4 \times 20\text{g} = 80\text{g}$ CHO.

Handy measures

When estimating portion sizes of your foods it can be useful to have a few handy measures to help. This can be particularly useful when you are eating out and do not have access to your reference guides or weighing scales.

	<p>2 mini new potatoes = 10g 1 egg size potato = 10g</p>
	<p>1 thin slice bread = 10g 1 medium slice = 15g 1 thick slice = 20g</p>
	<p>Ciabatta/panini (100g) = 50g CHO (1/2 weight)</p>
	<p>Fist size jacket potato (with skin) = 50g</p>
	<p>1 medium apple = 15g CHO</p>
	<p>Small banana = 15-20g Medium banana = 25-30g Large banana = 35-40g</p>
	<p>150g cooked pasta = 50g CHO (1/3 of weight)</p>
	<p>1 pint milk = 27g CHO</p>

Recipe

It can be very useful if you work out the carbohydrate of your favourite recipe.

Pancakes (six servings)

285ml milk

5 tbsp/60g flour

1 egg

top each pancake with

1 tbsp/15ml honey

Example:

- Identify the ingredients containing CHO.
- Calculate the amount of CHO of each ingredient using the label or reference tables:

Milk 285ml – 14g CHO

Flour 60g – 48g CHO

- Pancake batter has 62g CHO
- The batter makes 6 servings, therefore
 $1 \text{ serving} = 62\text{g} \div 6 = 10.3\text{g CHO}$.
- Add the tbsp. of honey per pancake (extra 12.7g CHO).
- One pancake with honey = 23g CHO (round up to 25g).

Write the CHO per serving next to your recipe. Next time it will save you doing the calculation again.

Eating out

Carbohydrate counting can become challenging when eating away from home. Practising at home will help you become more confident at estimating your carbohydrate portions without the need to weigh foods.

Follow a few of these handy tips:

- Plan ahead – look at menus online. Check portion information with the restaurant or food provider if possible before hand.
- You might choose to have several courses for your meal – consider the delayed effect of later courses being absorbed and causing higher blood sugars later on.
- Portion sizes and nutrient content of foods may differ from your normal meals at home – consider the effects of larger portions and higher fat foods on the absorption rate of carbohydrate.
- A single dose of quick acting insulin at the beginning of your meal may reduce your blood sugar too quickly and a high blood sugar may follow later when the rest of your meal is digested.
- You may want to split your meal time insulin to have half before and half after the meal to ensure it covers all of the carbohydrates you consume (pump users can give an extended bolus). Speak to your nurse and dietitian for further advise.

Insulin ratio

Dosing your fast acting insulin to cover your carbohydrate consumption can only be applied when you are on a 'Basal Bolus' insulin regime. This means you are taking a long acting (Basal) insulin (Lantus, Levemir, Tresiba and Toujeo). It is the fast or ultrafast (bolus) insulin (Novorapid, Humalog, Apidra) or ultra fast acting insulin (Fiasp or Lyumjev) with your meals.

It is the fast acting 'bolus' insulin that you adjust with your carbohydrate. You will be given a Insulin:CHO ratio (ICR) by your diabetes team. This can vary from person to person.

The example below will explain how to use your ICR:



1/2 tin of baked beans on 2 slices thick toast.

1/2 tin of beans = 32g CHO

2 thick slices toast = 40g CHO

Total CHO = 72g

With a ratio of 1 unit per 10g CHO:
 $70\text{g} \div 10\text{g} = 7.2$ units

Therefore seven units of fast acting insulin would be given for this meal with this ratio.

Please contact your diabetes specialist nurse before commencing insulin adjustment to ensure you are given the appropriate insulin:carb ratio for you.

When not to give insulin

- Snacks 10g or less (unless you use an insulin pump).
- For a snack over 10g when taken to cover an exercise session.
- For CHO to treat a hypo.
- For the CHO in alcoholic drinks.
- The CHO snack you have before bed after drinking a lot of alcohol

Note: Please seek further advise regarding dose adjustment for alcohol, exercise, illness.

Useful resources

Books

Chris Cheyette and Yello Balolia (2016) Carbs and Cals

A visual guide to carbohydrate counting and calorie counting for people with diabetes. (book and phone app available).

Apps

My fitness pal, cook and count (NHS approved) apps.

Nutracheck.

Websites

www.bertieonline.org.uk

www.diabetes.org.uk

www.bda.uk.com

www.runsweet.com

www.inputdiabetes.org.uk

www.carbsandcals.com

www.bhf.org.uk

www.bertie-streetwise.org.uk

Nutrition and Dietetics Department

Clinic 5, King's Treatment Centre, King's Mill Hospital
Mansfield Road, Sutton in Ashfield, Nottinghamshire, NG174JL
01623 622515, extension **6570** (Dietetics)

Further sources of information

NHS Choices: www.nhs.uk/conditions
Our website: www.sfh-tr.nhs.uk

Patient Experience Team (PET)

PET is available to help with any of your compliments, concerns or complaints, and will ensure a prompt and efficient service.

King's Mill Hospital: 01623 672222

Newark Hospital: 01636 685692

Email: sfh-tr.PET@nhs.net

If you would like this information in an alternative format, for example large print or easy read, or if you need help with communicating with us, for example because you use British Sign Language, please let us know.

You can call the Patient Experience Team on 01623 672222 or email sfh-tr.PET@nhs.net.

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