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Ashford Hospital
London Road
Ashford, Middlesex
TW15 3AA
Tel: **01784 884488**

St. Peter's Hospital
Guildford Road
Chertsey, Surrey
KT16 0PZ.
Tel: **01932 872000**

Website: **www.ashfordstpeters.nhs.uk**

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Carbohydrate Counting and Insulin Adjustment for Type 1 Diabetes

Paediatric Diabetes Department

Patient Information

Useful websites

www.bda.uk.com
www.diabetes.org.uk

Further Information

We endeavour to provide an excellent service at all times, but should you have any concerns please, in the first instance, raise these with the Clinical Nurse Leader, Senior Nurse or Manager on duty. If they cannot resolve your concern, please contact our Patient Experience Team on 01932 723553 or email asp-tr.patient.advice@nhs.net. If you remain concerned, the team can also advise upon how to make a formal complaint.

Author: Paediatric Dietitians **Department:** Nutrition and Dietetics
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For further information or advice please contact the Paediatric Dietitians at Ashford and St Peter's Hospital NHS Foundation Trust:

Write to:

Dietetics Department
St Peter's Hospital
Guildford Road
Chertsey
Surrey
KT16 0PZ

Telephone: 01932 723937

E Mail: asp-tr.paeddiabetes@nhs.net

Introduction

Carbohydrate counting is an important part of managing your diabetes as they are the main part of the food that affects your blood glucose levels.

- Food is made up of 3 nutrients:
- Protein
- Fat
- Carbohydrate

Most foods contain a mixture of all 3 nutrients, but foods which contain mainly protein and / or fat will have a minimal effect on your blood glucose levels.

Carbohydrates are found in mainly starchy and sugary foods. All carbohydrates are digested into glucose and appear in your bloodstream between 10 minutes and 2 hours after eating.

Carbohydrate counting is a system of assessing the quantity of carbohydrate in each meal or snack and injecting the right amount of insulin to match the food you have eaten.

Why do people use carbohydrate counting?

Carbohydrate counting gives you more choice and flexibility in both the type of food you eat and in the timings of your meals. It can also help you maintain your blood glucose levels closer to normal levels.

Which foods contain carbohydrate?

Many foods are a mixture of protein, fat and carbohydrate. The main sources are shown in the table below.

Nutrient	Examples of foods
Protein	Meat, poultry, fish, eggs, nuts, cheese
Fat	Butter, oil, margarine, cream
Carbohydrate	Starchy foods, sugary foods, fruit, milk

Protein foods alone will have little effect on your blood glucose levels, but some protein foods have carbohydrate added during processing. This may be flour or a cereal; examples of these are sausages, fish fingers, chicken nuggets or pastry goods such as quiches, pies and sausage rolls. You can check the food label for more information. We will cover this later on.

Eating out

Many people find it a challenge to try and calculate the amount of carbohydrate in foods and meals eaten away from home. As you become more practiced at working out the carbohydrate content of foods you normally eat, you will find it easier to estimate just by looking at how much carbohydrate is in the foods order.

Adjusting your insulin dose

Once you can carbohydrate count you can adjust the amount of insulin you are giving depending on the amount of carbohydrate you are having at each meal or snack.

To do this you will need to know your insulin to carbohydrate ratio.

For example your insulin to carbohydrate ratio may be 1:10.

This means you give 1 unit of insulin for every 10g of carbohydrate in your meal or snack.

E.g. if your meal contains 50g of carbohydrate you would need 5 units of insulin.

Everyone has individual insulin to carbohydrate ratios and it may be a different ratio for your breakfast, lunch and evening meal. This can be calculated by your Dietitian and Diabetes nurse.

To do this you will need to keep a food and insulin diary and return it to the Dietitian.

Let's practice!

A portion of your usual breakfast cereal weighs:

……

Use the food label on the packet of cereal to find out how much carbohydrate it contains per 100g

……

How much carbohydrate is there in your portion?

……..

Keeping a record

Once you have weighed your usual portion sizes and calculated how much carbohydrate each food contains, it may be worth keeping this information in an index file or A-Z index book so that you can refer to the information each time without having to re-weigh foods. However as you grow and your appetite changes your portion size may vary, so it's worth double checking that your figures are still up to date every now and again.

Fat has little effect on glucose levels after eating, but a large amount of fat can slow down the digestion of a meal and make your blood glucose levels rise more slowly. Examples of high fat foods which have this effect are fish and chips, burger and fries, Chinese or Indian meals from a takeaway or restaurant.

Carbohydrate foods will have the greatest effect on your blood glucose levels after eating. They include all starchy and sugary foods.

Starchy foods

All starchy foods contain carbohydrate. Examples of these include:

- rice
- pasta
- noodles
- bread
- breakfast cereals
- grains such as cous-cous and bulgar wheat
- flour and foods made from flour such as pastry, pizza bases, sauces
- plain biscuits, crackers
- starchy vegetables such as potatoes, yam, sweet potato, lentils, beans and dried peas

Sugary foods

There are 3 main categories of sugary foods and all will raise blood glucose levels after eating:

Any food made with **ordinary sugar** called **sucrose** contains carbohydrate. These foods include:

- cakes
- biscuits & chocolate
- sweets
- jam, honey, marmalade
- puddings, desserts
- squashes, fizzy drinks

Fruit contains natural sugar called **fructose** which is also a form of carbohydrate:

- fresh fruit
- dried fruit
- frozen fruit
- fruit juices and smoothies

Milk and milk products contain natural sugar called **lactose**.
All milk contains carbohydrate including:

- full cream, semi skimmed and skimmed milk
- long life, pasteurised
- custard
- ice cream
- yoghurt and fromage frais

Or you can use the following formula:

$$\frac{\text{Amount of carbohydrate in 100g of food}}{100} \times \text{weight of food}$$

Example:

Raw jacket potato weighs 250g and the packet shows that 100g raw potato equals 17g CHO, so…

100g of potato = 17g CHO

1g of potato = 17g divided by 100 = 0.17g CHO

Then 250g potato = 0.17g X 250g = 42.5g CHO

NB: The total meal carbohydrate content has to be calculated.

2. Weighing foods

You can weigh your food using digital kitchen scales and work out the amount of carbohydrate in your portion by using food packets or food tables. This system is useful for foods like breakfast cereals, pasta and rice as portion sizes can vary quite a lot between different people. You need to weigh food in grams (g) rather than ounces (oz) as most food tables will give you the amount of carbohydrate per 100g. You can work out the amount of carbohydrate by doing the following:

- Weigh the food in grams and note the weight
- Look up the amount of carbohydrate per 100g on your food packet for the food you are eating and make a note of it
- Divide the amount of carbohydrate in 100g of food by 100
- This will give you the amount of carbohydrate in 1g of food
- Multiply the result by the weight of food you are going to eat
- This will give you the amount of carbohydrate in your portion of food

How Do I Work Out the Carbohydrate Content of my Food?

There are different ways to do this and we will learn more and practice each of these in turn.

1. Using food labels

Many food manufacturers now supply nutritional information on the label about the carbohydrate content of that food.

The information can be shown as either **per 100g** or **per portion.** If you use the value per 100g then you will need to know the weight of the portion you are eating and you can use the formula on page 9 to work out the carbohydrate content.

You may find the information per portion more useful, but remember that your portion size may not match that recommended by the manufacturer.

Let's practice!

Pepperoni Pizza 300g

	Per 100g	Per 150g serving
Energy	275kcal	412kcal
Carbohydrate	25.3g	38g
(of which sugars)	3.4g	5.1g
Fat	12.4g	18.6g

This is an example of a label with nutritional information for a pepperoni pizza. It gives you the information both per 100g and for a 150g serving (which is half the pizza).

If you ate the whole pizza how much carbohydrate would you have …….

1. Using food reference tables

For foods such as fruits, fresh or home baked cakes and pastries, take-aways and homemade meals, there are no food labels available to calculate the carbohydrate portion.

For these foods you need to use reference tables to help you. The one we recommend is: **Carbs & Cals by Chris Cheyette and Yello Balolia.**

They are available either as an app for your android or iphone or as a reference book.