## Notes

**Name:**

**Date:**

**Diabetes Specialist Dietitian:**

**Contact Number:**

**Hospital Site:**

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Barts Health NHS Trust

Patient information

# Guide to Carbohydrate Counting

A detailed guide for people with Type 1 Diabetes

Nutrition and Dietetics department

**Introduction:** Carbohydrate (CHO) counting involves working out how much total CHO is in a meal or food and then calculating how much insulin will be needed for that total meal.

### Advantages of CHO counting

By matching the dose of insulin to the amount of CHO in a meal you can:

- Improve your diabetes control
- Enjoy meals out
- Enjoy a variety of meals
- Eat large or small meals
- Reduce hypoglycaemia
- Avoid feeling guilty about eating sweet foods

### Disadvantages of CHO counting

Apart from putting some time and effort in at the beginning and doing a few extra blood tests, once you are up and running there are not really any disadvantages.

## CHO counting….What you need to know?

- What CHOs are
- How to count CHOs
- How to read food labels
- The relationship between CHO, blood glucose and Insulin
- How to work out your insulin to CHO ratio
- How to work out and use a correction dose

## What is CHO?

CHOs are nutrients that are found in food and drinks. When CHOs are digested, it breaks down into glucose which then moves into the bloodstream. **CHOs are found in the following types of food:** (this is not a comprehensive list)

| **Starchy CHO** | **Sugary CHO** |
|---|---|
| Bread | Sugar |
| English muffins/ Bagel | Jam |
| Pitta/ Naan bread | Marmalade |
| Chapatti/Tortillas | Honey |
| Croissant/ Crumpet | Syrup |
| Dumpling/ Yorkshire puddings | Sweets |
| Pasta/ Spaghetti | Chocolates |
| Noodles | Sugary drinks; fizzy and squash |
| Rice | Jelly |
| Couscous | Fresh, dried and frozen fruit |
| Breakfast cereals (all types) | Pure fruit juice |
| Potatoes | Milk |
| Yam /Cassava/ Fufu | Yoghurt (plain and flavoured) |
| Plantain | Fromage Frais |
| Green banana | Custard/ Ice cream |



## What is a correction dose?

This is how much one unit of rapid acting insulin will reduce your blood glucose by. This is also worked out from your current total insulin dose. If your blood glucose before a meal is high you will need to give extra insulin on top of the amount you have worked out for your CHO to bring the BGL down to normal ranges. This is called a **correction dose**.

Do not attempt to use a correction dose without speaking to your DSN or diabetes dietitian.

**EXAMPLE**
Correction dose has been calculated as 1 unit of rapid acting insulin reduces blood glucose by 3mmol

If your pre meal blood glucose is 15mmol and you want to get your blood glucose down to 9mmol (reducing your BGL by 6mmol). This would mean giving 2 units of insulin as a correction dose in addition to the insulin required to cover the carbohydrate in the meal.

Carbohydrate in meal = 50g
Insulin for meal = **5 units** (if insulin: carbohydrate ratio = 1u:10g)
Correction dose needed = **2 units**
Total insulin required = **7 units**
(Don't use a correction dose when doing a test meal)

**Therefore the amount of insulin given before each meal consists of the insulin required to cover the carbohydrate being eaten in the meal plus the correction dose required to bring the blood glucose down to 9mmol**.

**EXAMPLE**

Insulin to carbohydrate ratio – *1 unit of insulin per 10g CHO (1u:10g)*

- Blood glucose before eating is 8mmol
- Meal contains 50g carbohydrate
- 5 units of insulin is given
- Blood glucose 2 hours later is 6.9mmol

Conclusion – insulin to carbohydrate ratio is correct.

**Test meal 1**
2 Weetabix and 200ml (1/3 pint) of milk = 30g+10g = **40g CHO**

**Test meal 2**
2 medium slices of bread/toast and 100ml fresh orange juice = 30g + 10g = **40g CHO**

**Test meal 3**
Sandwich (2 medium slices of bread) with low fat yoghurt = 30g + 15g = **45g CHO**

It is advisable to do a number of test meals in the first week or two when you start CHO counting and make a note of them in the diary you will be given.

It is best to do a test meal when you have not used a **correction dose.**



## How to count carbohydrates?

**I know which foods contain CHO but how do I know how <u>much</u> CHO is in the foods I am eating?**

You will be given a separate list of foods and their CHO content. It may seem like a lot to learn in the beginning, and you might need to weigh some foods at first. Most people eat the same types of food regularly so you will soon get to know the CHO content of these foods. Here are some examples for you.

| **Food** | **Grams Carbohydrate** | | | |
|---|---|---|---|---|
| | **10g** | **15g** | **20g** | **30g** |
| **Bread** | Thin slice | Medium slice | Thick slice | Bread roll |
| **Fruit** | 1 medium peach<br>2 kiwi, plums or satsumas | 1 medium pear, apple or orange | 1tbsp sultanas or raisins,<br>1 medium banana | 1 large banana or orange |
| **Potato** | 1 egg size, 1 scoop mash or 1 roast potato | 1 round tbsp mash | 2 egg size | 3 egg sized |
| **Milk and yoghurt** | 1 small carton (125g) natural or diet yoghurt or 200ml (1/3 pint) milk | 1 small carton (125g) low fat yoghurt | 1 pot yoghurt (150g ) | Corner yoghurt or 600ml (~1 pint) milk |

## How to read nutritional labels?

In addition to having the list of CHO portions you can also find out how much carbohydrate is in a food by reading the nutritional information on the food label. Always "round off" to the nearest 5g CHO.
Example a label from a readymade Lasagne pack size = 800g

| **Nutritional Information** | **Per 100g product** | **Per ½ pack** |
|---|---|---|
| Energy | 148 Kcal | 592Kcal |
| Protein | 6.0g | 24.0g |
| **Carbohydrate** | **13g** | **52g** |
| Of which sugars | 3.0g | 12.0g |
| Of which starch | 10g | 40g |
| Fat | 8.0g | 32g |

**Per Serving**
This label gives you information **per serving** which is ½ of the pack (400g) therefore a serving will provide 52g CHO which can be rounded off to 50g CHO.

**Per 100g**
You can also work out how much is in a serving by looking at the "per 100g" section. The weight of the whole Lasagne is 800g.
By eating ½ of the pack you would know you were eating 400g.
This pack contains 13g CHO per 100g.
Therefore in 400g there would be 4 x 13g = 52g which can be rounded down to 50g carbohydrate.

**Remember, it is the <u>total carbohydrate</u> number you are looking at, not the sugars or starches. (Ask your Dietitian for more details on reading food labels if you want to know more)**



## The relationship between CHO, blood glucose and insulin

Most of the starches and sugars we eat appear in the blood as glucose within 15 minutes to 2 hours after they are eaten. We need to match this rise in glucose with the right amount of rapid acting insulin (Humalog, Novorapid or Apidra).

The amount of CHO in your diet determines the amount of insulin you will need – the more CHO you eat the more insulin you will need.

## Insulin to CHO ratio

How many grams of CHO are covered by 1u of insulin. This is worked out by looking at the **food diaries that you complete**. Each person's ratio is different and will be worked out for you by your dietitian and DSN, your ratio may need to change with time.

<u>Examples of ratios:</u>
1u insulin per 5g CHO
1u insulin per 10g CHO
1u insulin per 15g CHO

## Checking your insulin to carbohydrate ratio with a Test Meal

- Test your *blood glucose level (BGL)* before a meal
- Estimate the *CHO content* of the meal (CHO content provided with the test meal)
- Take the *required amount of insulin*
- Eat the meal
- Test your *BGL 2 hours after the meal*

Your blood glucose should be within 2-3 mmol/l of the before meal BGL. If your 2 hour post meal BGL is higher than this you need more insulin per CHO eaten and if it is lower you need less. (Ask your Dietitian for some ideas for test meals)