

Nutrition and Dietetics

Paediatric Diabetes - A step-by-step guide to carb-counting with accuracy

What is it and why do it?

Glucose in the blood comes from **carbohydrates** eaten in the diet, for which insulin must be given.

Carb-counting (carbohydrate counting) allows you to calculate the right amount of insulin based on the amount of carbohydrate eaten. This helps achieve better diabetes control and improves both short and long-term health outcomes.

What are carbohydrates?

Carbohydrates are components of foods that are broken down and absorbed by the body as glucose.

Which foods contain carbohydrates?



Foods containing carbs	Examples
All fruits	Apple, banana, grapes
Some starchy vegetables (non-starchy vegetables are carbohydrate-free)	Sweetcorn, peas, sweet potato, potatoes, butternut squash
All breads, cereals and grains	Wraps, crumpets, rice, noodles, pasta, breads
Legumes and pulses	Beans, lentils, chickpeas
Processed protein foods	Chicken nuggets, fish fingers, some sausages



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Milk and yoghurt	
Most discretionary foods, snacks, drinks and sauces.	Biscuits, crisps, chocolates, ketchup, juices, fizzy drinks

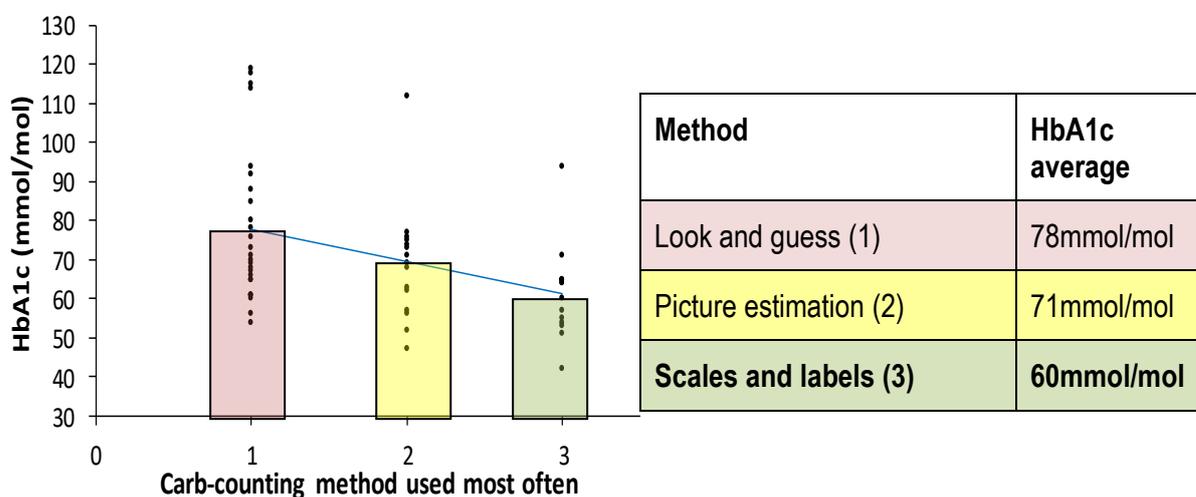
How accurate do you need to be?

It is important to be as accurate as possible when carb-counting. There are a variety of methods for carb-counting, with varying degrees of accuracy. These are listed below in order of low to high accuracy.

1. **Look and guess.** In this method, you look at a portion and guess the carbohydrate content.
2. **Picture estimation.** Pictures in carbohydrate counting books or apps are used to estimate portion size. The carbohydrate amount is taken from the picture that most closely resembles this portion.
3. **Scales and labels.** Portions are weighed using digital scales and carbohydrate calculated based on this weight. **This is the gold-standard for accuracy, as it avoids subjective perception of portion size.**

Using the most accurate method regularly can have important benefits for your child's diabetes management and long-term health.

The graph below shows local Coventry data. It shows that children and young people who regularly follow the weighing method for carb-counting have significantly lower HbA1c levels.



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Weighing food may appear more time-consuming, but parents and children soon adopt this skill with ease. With practice and a bit of planning, it becomes a manageable part of daily life.

This diet sheet explains how to carb-count different foods using the standard method.

Carb-counting using the gold-standard method

This section explains in detail how to use the most accurate carb-counting method for different foods.

A. Packaged foods where labels state portions as “per piece”

For pre-packed, labelled foods, carbohydrates are listed per slice or piece (example: sliced bread, biscuits, Weetabix). This eliminates the need for weighing, as portions are set and consistent.

Example (A):

The label for this bread shows carbohydrate **amounts for each slice**.

Each slice provides **20.4g** carbohydrate.

Typical Values	Per 100g	Per Slice 44g	% Reference Intake*
Energy	1081kJ / 256 kcal	475kJ / 112 kcal	6%
Fat	2.4g	1.0g	1%
of which saturates	0.7g	0.3g	2%
Carbohydrate	46.4g	20.4g	8%
of which sugars	3.4g	1.5g	2%
Fibre	3.7g	1.6g	
Protein	10.3g	4.5g	9%
Salt	1.03g	0.45g	8%

This loaf contains 18 slices
*Reference Intake of an average adult (8400 kJ / 2000 kcal)
Made by Premier Foods Group Ltd. Hovis, Granary and HOVIS Since 1886
Bread 'Device' are registered trademarks of the Premier Foods Group.

To calculate the total carbohydrate contribution:

Count the number of slices your child will have.

Multiply by the carbohydrate per slice.

For example, if your child eats 2 slices: 2 slices x 20.4g = 40.8g.

Round-up the total to **41 g carbohydrate**.

Practice exercise (A).

Your child wants to eat 3 biscuits with their evening meal.

Use the label on the left and the space below to calculate the amount of carbohydrates the 3 biscuits will provide.

Nutrition	per 100g		per biscuit (approx. 12g)		GDA	
	per 100g	per 100g	per 100g	per 100g	Average adult	per portion
Typical Values	2080 kJ	250 kJ	2080 kJ	250 kJ	8400 kJ	
Energy value	2080 kJ	250 kJ	2080 kJ	250 kJ	8400 kJ	3%
(Calories)	495 kcal	60 kcal	495 kcal	60 kcal	2000 kcal	
Fat	22.8 g	2.7 g	High	High	70 g	4%
(of which Saturates)	13.4 g	1.6 g	High	High	20 g	9%
Carbohydrate	66.2 g	7.9 g			260 g	4%
(of which Sugars)	27.4 g	3.3 g	High	High	90 g	4%
Fibre	2.1 g	0.2 g			24 g	1%
Protein	5.6 g	0.7 g			50 g	2%
Salt	0.4 g	Trace g	Med	Med	6 g	<1%

GDA = Guideline Daily Amounts

Advice Storage - After opening store in an air-tight container.

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1. Locate the carbohydrate value **per biscuit** on the label.
2. Multiply the carbohydrate value per biscuit by the number of biscuits (3).
3. Write the total carbohydrate amount below.

Calculation Space:

Carbohydrate per biscuit: _____ g

Number of biscuits: **3**

Total carbohydrate: _____ g

B. Foods where portions are listed in weight

Some foods provide their carbohydrate content based on weight in grams, and portion sizes vary depending on how much is served. Examples of food: milk, cereal, pasta, beans, lentils and rice

Even if you consistently use the same bowls, plates or scoops, the actual weight of each portion can vary.

Example (B).

1. Determine carbs per 1g of cereal

Label states 84g carbs in 100g cereal.

$84\text{g} \div 100 = \mathbf{0.84\text{g}}$ carbs per 1 g cereal

2. Multiply the answer to step 1 by portion weight.

Cereal portion weighs **54g**.

$0.84 \times 54 = \mathbf{45.4\text{g}}$ carbohydrate in the cereal portion

Don't forget to add the milk! (see next page)

NUTRITION INFORMATION		
	<input checked="" type="radio"/> Per 100g	<input type="radio"/> Per 30 g serving
ENERGY	1604 kJ 378 kcal	481 kJ 113 kcal
FAT	0.9 g	0.3 g
of which saturates	0.2 g	0.1 g
CARBOHYDRATE	84 g	25 g
of which are sugars	8 g	2.4 g
FIBRE	3 g	0.9 g
PROTEIN	7 g	2.1 g
SALT	1.13 g	0.34 g



Example (B) (continued). Add on milk.

You now know the carbs for the cereal portion. Now, let's add the carbs for the milk.



Zero the bowl on the scales. Pour the milk into the bowl and make note of the weight (324g)

1. Calculate carbs per 1g of milk

The label shows 4.9g of carbs in 100g of milk.
 $4.9g \div 100 = 0.049g$ of carbs per 1g milk

2. Multiply the carbs per gram by the weight of your milk portion.

The milk portion weighs 324g.

$0.049 \times 324 = 15.8g$ of carbohydrate in the milk portion

3. Now add the carbs from the milk and the cereal
45.4g (cereal) + 15.8g (milk) = 61g
 So, the total carbs for your cereal and milk portion is **61g**.

Nutrition: 1 serving = 200ml

Typical Values (as sold)	Per 100ml
Energy	156kJ/37kcal
Fat	<0.5g
of which saturates	<0.1g
Carbohydrate	4.9g
of which sugars	4.9g
Fibre	<0.5g
Protein	3.6g
Salt	0.11g

This pack contains an average of 2 servings



Typical Values	Per 100g / Per 100ml
Energy	514kJ / 121kcal
Fat	0.5g
Saturates	0.1g
Carbohydrate	25.6g
Sugars	0.1g
Fibre	0.5g
Protein	3.3g
Salt	<0.01g

Practice exercise (B)

You've boiled rice for the whole family to have with the evening meal. To carb-count your child's portion, you have weighed their bowl, set the scale to zero and then added their rice portion, which weighs 170g.

1. To work out the carbs per 1g of rice:

If the label states there are 72g of carbs in 100g of rice, we calculate the carbs per gram as follows:

$$72\text{g} \div 100 = 0.72\text{g of carbs per 1g of rice.}$$

2. To calculate the carbs are in your child's rice portion weighing 170g: Multiply the carbs per gram (0.72g) by the weight of your child's rice portion (170g):

$$0.72\text{g} \times 170\text{g} = 122.4\text{g of carbohydrates in the 170g of rice.}$$

3. To calculate the insulin required:

Assuming no other carbs are eaten at this meal, you will need to know the carbohydrate-to-insulin ratio, which is set by your doctor or diabetes care team.

For example, if the ratio is 1 unit of insulin for every 10g of carbohydrate $122.4\text{g} \div 10 = \mathbf{12.24 \text{ units of insulin}}$.

So, your child will need around **12 units of insulin** to cover their rice portion.

If the pre-meal blood glucose is 6.5 mmol/L, which is within the target range (typically 4-7 mmol/L), no correction would be necessary for the blood glucose. However, the insulin needed for the carbs should be given.

Foods without labels or with unsuitable labels

Sometimes, foods don't come with labels (for example, fruits or potatoes). Other times, you may not have access to a label or the label may not give the necessary information. For example, some rice and pasta labels may only show information for the dry weight, not the cooked weight. In these cases, you can use your carbohydrate counting app for help.

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Practice exercise (C)

Bananas come in different sizes, which means their carbohydrate content can vary. You are preparing your child's packed lunch and want to make sure you are calculating the correct amount of carbs, so you decide to weigh the banana.



1. Using your carb counting app or book, determine the carbs per 1g of banana.
2. Calculate the total carbs for this banana, which weighs 167g with the peel on.

Putting it all together to carb-count home-made dishes and home-baked goods

This section explains how to carb-count home-made recipes by calculating the carbohydrates in individual ingredients (using the methods described above).

Chicken biryani recipe example

The following example shows how to carb-count a home-made chicken biryani.

Ingredient	Carb-counting breakdown	Total Carbs in recipe
300g basmati rice (dry)	Label states 77.7g carbs per 100g dry uncooked rice. $77.7 \div 100 = 0.777$ g carbs per 1g dry rice $0.777 \times 300 = 233$ g carbs in 300g dry rice	233g
25g butter	Nil	0g
1 large onion	Nil	0g
3 cardamon pods	Nil	0g
1 small cinnamon stick	Nil	0g

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1 tsp turmeric	Nil	0g
4 skinless chicken breasts	Nil	0g
4 tbsp Patak Balti curry paste	Label states 10.5g carbs per 100g paste. Weight of 4 tbsp is 60g. $10.5 \div 100 = 0.105$ g carbs per 1g paste $0.105 \times 60 = 6$ g carbs in 60g paste (4tbsp)	6g
85g seedless raisins	Label states 74.5g carbs in 100g seedless raisins. $74.5 \div 100 = 0.745$ g carbs in 1g raisins $0.745 \times 85 = 63$ g carbs in 85g raisins	63g
850ml chicken stock	Label states 1.5g carbs in 100ml of stock (prepared according to packet instructions). $1.5 \div 100 = 0.015$ g carbs per 1ml of stock $0.015 \times 850\text{ml} = 13$ g carbs in 850ml stock	13g
30g fresh coriander	Nil	0g
TOTAL		315g

- The first step** is to calculate the carbohydrate content for each individual ingredient based on the amounts used in the recipe.

You do not need to carb-count carbohydrate-free foods but remember to check nutrition labels to make sure the food does not have any carbohydrates. See page 5 for more details on how to do this.
- Once you have carb-counted all the ingredients individually**, add them together to find the total amount of carbohydrates in the recipe.

For example: 233g (rice) + 6g (curry paste) + 63g (raisins) + 13g (stock) = 315g carbs.
- If you are dividing the recipe into equal portions**, divide the total carbohydrate (315g) by the number of servings the recipe makes.

For example, if you portion the recipe into 4 equal servings:
 $315\text{g} \div 4 = 79$ g carbs per serving.

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- **If you are not dividing the recipe into equal serves**, (for example, if your child is having a smaller portion than the rest of the family), you can:
 - Weigh the whole finished dish. For example, the whole biryani weighs 1,700g.
 - Divide the total carbohydrates in the dish by the total weight.
For example: $315\text{g} \div 1,700\text{g weight} = 0.185\text{g carbs per 1g of biryani}$.
 - Multiply the result from step 2 by the weight of your child's portion.
For example, if your child's portion weighs 285g:
 $0.185 \times 285 = 53\text{g carbs in your child's portion}$.

Home-baked goods

For carb-counting home-baked goods, please see 'baking ideas' diet sheet.

Eating out

When eating out at many large chain restaurants, cafes and fast-food outlets nutritional information is often available online. Many also provide printed information in the restaurant. A quick Google search on your phone can help you avoid guessing and potentially giving the wrong amount of insulin.

If no information is available, use your carb-counting book or app to estimate the carbohydrate amount. Although this method is less accurate, there are a few tips to help minimise issues:

1. **Re-check your blood sugar levels 2-3 hours after eating and give correction insulin doses if necessary.**
2. **Keep a note of the carbohydrate amounts you have guessed for particular portions and adjust your guess next time you eat out.**
We suggest making a note of this on your smart phone so you can refer to it later.
3. **Try to use the gold-standard method as much as possible at home.**
The more accurately you measure carbohydrate portions at home, the better you will be at estimating when you have to guess.

Save time and make a carb-counting cheat sheet

Carb-counting with weights may seem time-consuming at first. However, taking the time to make a carb-counting cheat-sheet at the start will soon make this daily task quick and easy. To do this:

- Go through your cupboards and pick out the foods you use most often. List them in the table below.
- Check food labels and calculate the carbs per 1g of food. Write this number in the table.
- For foods without labels, use your carb-counting book or app to calculate carbs per 1g of food and record the number.
- When it's time to carb-count, simply weigh the food right before the meal and multiply by the appropriate number on your cheat sheet. This makes sure perfect carb-counting every time with minimal effort.

Food	Carbs per 1g of food
example: Milk	0.05g carbs/ 1g milk

Patient Information

Please contact your diabetes nurse on 024 7696 7230 or your dietitian on 024 7696 6161 if you need any help.

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