

Birmingham School Meals: Guidance on Carbohydrate counting

Watch me: How to use this guide

Children with Type I Diabetes do not require a special diet and can enjoy the same foods and meals as any other child. However, keeping the meals in proportion with the *eat well plate* will help promote good health.

What is different for children with Type I Diabetes?

Children with Type 1 Diabetes follow an insulin regime that requires them to take a blood glucose level, count the carbohydrate in their meal, and then calculate an appropriate insulin dose. This guide tells you which foods need to be counted as carbohydrate, how to calculate the carbohydrate amount, and this information can be used to help calculate the appropriate insulin dose.

Four simple steps:

1. **Preparation:** Insulin needs to be given **15 minutes before food is eaten**, therefore the blood glucose level, carbohydrate calculation and subsequent insulin dose will need to be completed before going into the dining room.
2. **Carbohydrate counting:** Once the food is chosen from the menu or lunch box, calculate the amount of carbohydrate using the *School meals & handy measures guide* (at the end of this booklet).
3. **Insulin calculation:** Once the carbohydrate is calculated and blood glucose level taken, you will need to work out the insulin dose.
4. **Deliver the insulin and monitor intake:** Deliver the insulin and watch to ensure all the meal is eaten and record. If the all of the meal is not eaten work out how much extra carbohydrate is needed, and supplement with food the child/young person will eat.
 - a. If the child/young person does not consistently eat all the food given, giving insulin after the meal may be a safer option, but is not preferable. Please discuss with the diabetes team before taking this option.

Counting Carbohydrate

Carbohydrate is the principal source of energy for the body, and is essential for concentration, sports and daily activities. Aim to get the majority of carbohydrate from starches, fruit and milk based foods to promote a balanced nutritional intake.

Where do you find Carbohydrates?			
Sugars These raise blood sugar levels rapidly.	Natural Sugars Fructose (fruit sugar) Lactose (milk sugar) These raise Blood glucose levels gradually. They contain useful nutrients such as vitamins and minerals so are important as part of a balanced diet.		Starches These often take longer to digest and so are excellent choices as they raise blood sugars levels gradually.
• All foods containing added sugar (sucrose) are carbohydrate foods • They include sugar which may be added to food • Ordinary fizzy drinks, squashes • Sugary cereals • Sweets and chocolates • Honey, jam and marmalades • Sweetened fruit juice	• Fresh fruit • Frozen, tinned or dried fruit	• Milk • Milkshakes • Ice cream • Yogurts • Fromage frais	These carbohydrates have a more complex structure • Potatoes • Rice • Pasta • Bread • Breakfast cereals and oats • All flour products: pizza pastry and baked foods

Foods not containing carbohydrate

Protein

The main sources of protein such as meat, fish, eggs and cheese do not contain any carbohydrate, unless they are made with breadcrumbs e.g. Shammi kebabs, fish fingers, then they will need to be counted. Fish in batter and Quorn dishes also need to be counted.

Vegetables & salad

The only vegetables to carbohydrate count are baked beans, peas and sweetcorn. Promote vegetables and salad as often as possible as these are packed with vitamins and minerals.

Drinks

Water, 'no added sugar' squash and 'diet' drinks **do not** have any carbohydrate value and can be consumed at any point. Fruit juices, milk and milkshakes have a carbohydrate value and if to be consumed, must be so at lunchtime and included in the carbohydrate calculation. All ordinary/full sugar fizzy drinks and most drinks in cartons will be **high in sugar** and are not recommended unless used for exercise or for treating a 'hypo'.

School Menus

The Birmingham Children's Hospital Diabetes Dietitians have developed a *handy measures guide* to support you with carbohydrate counting your school menu. This guide gives the values of the common carbohydrate foods by handy measures and weight in grams, which allows easy calculation of foods that are dished out at dinner times e.g. bread, rice, pasta, potatoes, fruit, peas, sweetcorn etc. We would encourage you to get in touch with your catering supplier in order to get hold of the nutritional values for your school menu. Please use the carbohydrate counting guide and information provided by your catering supplier to accurately carbohydrate count your menu.

Carbs & Cals book

For any foods not listed in the *School meals & handy measures guide*, you can refer to the book 'Carbs & Cals', which is available online (Amazon), via APP on android or iPhone, or in book shops. If you wish to use electronic scales to check the portion sizes and match this to the picture portion illustrated, this will be more accurate. <http://www.carbsandcals.com/>

Carbohydrate Counting – What is the best method?

There are lots of resources, techniques, tips and tricks for carbohydrate counting, all with advantages and disadvantages. The most accurate methods involve weighing foods. Sometimes this is not possible and you will need to use different techniques according to the situation. Listed below are the different methods.

1. Carbs & Cals Book and APP:
 - a. Weighing is the most accurate
 - b. Guessing using the closest picture to your meal
2. Food labels: carbohydrate information – weighing and working out your portion sizes or using the typical portion on the label

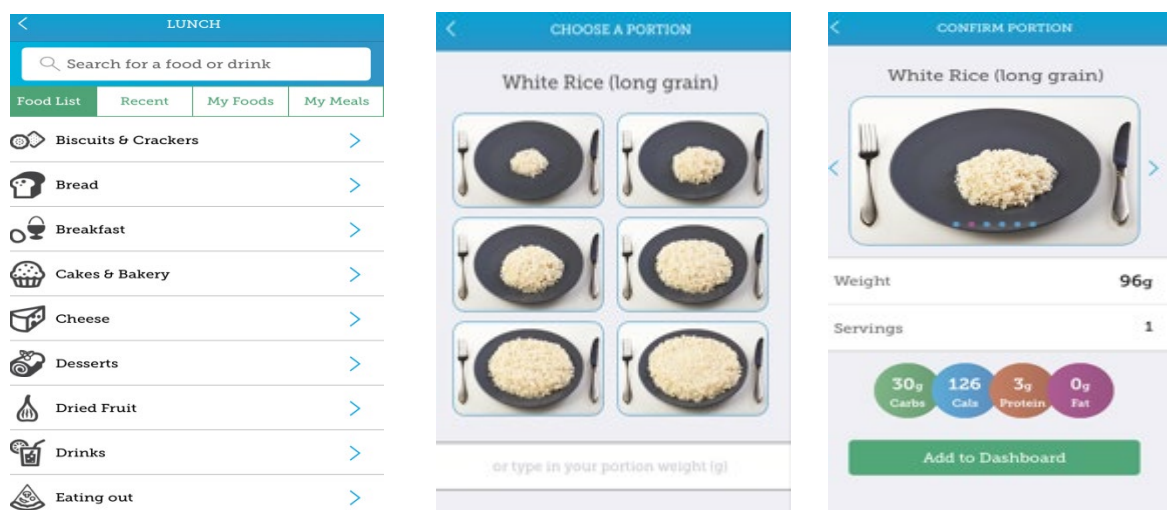
Carbs & Cals Book and APP:

Watch me:
Carbs & Cals iPhone/iPad example

Carbs & Cals is a pictorial resource that has photographs of most commonly eaten foods, and displays their carbohydrate amount (green tab at the top) for that portion size. It has standard size crockery to help you see if the portion is the same as yours.

If you or kitchen staff are able to weigh a typical portion of foods served (e.g. rice or pasta) and enter this weight (in grams) the app will work out how much carbohydrate is in that amount of each food. Often people choose the plate that looks most like theirs and use that carbohydrate amount. This will provide a good estimate and is effective often but can sometimes be inaccurate, as their portion size is different to than in the book even though they look similar.

The carbs and cals app can be a very useful tool to have at your school. This can be easily downloaded into your iPads via App store. The carbs and cals app allows you to enter the weight of your portion and it can then calculate the carbohydrate value.



You can search for your food by either using the search tab or scrolling down the food groups.

Select the closest portion size to the one you are having **OR** if you can weight the food, enter the weight of your portion.

In 96g of rice there is 30g Carbohydrates as illustrated above.

The carbs and cals book can also be a very useful tool for carbohydrate counting. Again as with the app you can find photographs of most commonly eaten foods, and displays their carbohydrate amount (green tab at the top) for that portion size. It has standard size crockery to help you see if the portion is the same as yours.

In order to calculate your carbohydrate value you will need to use the equation below.

Carbohydrate (green label) (g) ÷ Weight (white label below food) g)	x your portion (g)	= Carb in your portion (g)
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**Watch me:
Carbs & Cals
book example**

In the above picture, its indicating that 203g pasta contains **70g CARBS**.

If they were to eat 150g (measured on the scales) of pasta this would contain **51g CARBS** using the equation above.

70g		
÷		
203g	150x g	= 51g

We would encourage you to carbohydrate count your menus in advance and label your menus with this information to make lunch time easier. If you are unable to obtain carbohydrate values from your catering supplier you can use this guide to help you carbohydrate count by weighing your portions and using the advice in this leaflet.

Food Labels

Food labels can also be used to carbohydrate count, you may find that this method is particularly useful during school parties. Amounts on labels are given 'per 100g'. Sometimes they are also given per 'portion/per serving'. If you prefer using per portion you need to ensure that your portion size matches the suggested from the manufacture. Per slice of Victoria Sponge has 29.7g carbs.

Below is a food label for a Victoria sponge cake

Table of Nutritional Information

Typical Values	Per 100g	Per slice
Energy	1643kJ	904kJ
	392kcal	216kcal
Carbohydrate	53.9g	29.7g
of which sugars	32.2g	17.8g

**Watch me:
Food label example**

If the label does not tell the Total carbohydrate per portion size or the portion size you are going to have is more or less than the suggested portion size, you will need to weigh the food and use **per 100g**. The method below allows you to work out the carbohydrate for your portion size:

$$\frac{\text{Total Carbohydrate per 100g}}{100} \times \text{Your portion (g)} = \text{Carbohydrate (g)}$$

When carbohydrate counting food with the use of a food label you will always need the total carbohydrates amount as this will include both the added sugar and the starch carbohydrate.

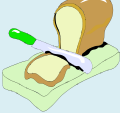
The example above is indicating that **100g** of cake contains **53.9g** carbohydrates and **29.7g** per slice.

As with carbs and cals book you can also use the equation below to calculate the amount of carbohydrate your portion contains. If the cake portion to be eaten weighs 40g, the carbohydrate would be 22g, as shown in the calculation below.

$$\frac{53.9g}{100g} \times 40g = 22g$$

Typical Portions CHO guide

The following list may be useful if you are unable to weigh foods and don't have access to packaging or the carbs & cals book/APP. This is a rough guide and may be handy if a child does not finish a meal and you are looking for "replacement" carbohydrates.

Breads (weight of food on scales) 	Carbohydrate (g)
1 medium slice bread	15
1 thick slice bread	20
1 extra thick slice bread	30
1 bread roll	25
1 croissant	20
1 small pitta bread	20
1 large pitta bread	40
1 crumpet	20
1 small baguette	50
Garlic bread – piece 1 inches/2.5 cm long	10
1 English Muffin	30
1 Hot Cross bun	30
1 teacake	45
1 Chapati	20
1 Naan bread (60g)	30
Yorkshire Pudding(x 2 small)	10

Vegetables	Carbohydrate (g)
	
Baked beans (a quarter of a tin)	15
2 tablespoons sweetcorn	10
2 tablespoons peas	10

Fruit	Carbohydrate (g)
	
1 small piece fresh fruit e.g. Cox's apple	10
1 medium piece fresh fruit e.g. Golden Delicious apple, Orange, Peach or Pear	15
1 large piece fresh fruit e.g. Large Granny Smith apple	20
1 Banana (weighed with skin)	17
2 satsumas, clementines, tangerines, kiwi fruit	15
10 grapes or 10 cherries	10
Strawberries	5
1 slice melon	10
100g fresh pineapple or 2 slices or 10 chunks tinned pineapple	10
2 medium plums or apricots	10
1 whole grapefruit	10
1 tablespoon dried fruit (e.g. 1 matchbox portion)	10
1 portion of tinned fruit in natural juice (equivalent to piece of fruit)	15
100ml unsweetened fresh fruit juice	12
1 small carton (200ml) unsweetened fresh fruit juice	25

Pasta & Noodles	
	Carbohydrate (g)
Cooked pasta	25
1 tablespoon pasta	10
Egg noodles	20

Biscuits and Cakes	
	Carbohydrate (g)
1 Digestive or Hob Nob type biscuit	10
2 small plain or semi-sweet type biscuits (e.g. Rich tea)	12
2 plain fruity type biscuits (e.g. Garibaldi)	12
1 cream filled biscuit e.g. Custard Cream or Bourbon	8
2 cream cracker type biscuits or 2 crispbreads	10
1 oat based cereal bar (e.g. Quaker Chewee)	15
1 small chocolate biscuit e.g. 2 finger Kit Kat	12
1 mini roll	25
1 scone	30

Rice	
	Carbohydrate (g)
Cooked rice	30
1 tablespoon	10

Milk and milk products	Carbohydrate (g)
100ml milk (all types)	5
1 carton ordinary fruit yoghurt	15
1 small carton fromage frais	7
1 large scoop vanilla ice cream	15
1 choc ice	10
1 carton mousse	20
Custard 60g	10
Potatoes 	Carbohydrate (g)
100g mashed, boiled, jacket or roast potato (N.B. Jacket potato- if not eating skin please deduct 10g from recommended guide).	15
1 scoop mashed potato	10
2 egg size potato – boiled, roast	10
Oven baked sliced potato	15
Oven Baked Potato Wedges	15
5 standard Chips (oven baked)	10
100g Chips	30
Small Jacket potato (with skin)	20
Medium Jacket potato (with skin)	50
Large Jacket potato (with skin)	75
Potato Waffle	10
Potato Smiles (x 2 frozen)	10
Yam, raw,	30

Main Meal	Carbohydrate (g)
Beef Enchillada	30
Breaded Fish	35
Cheese and Potato Pie	20
Cornish slice	65
Italian Lasagne	45
Salmon fishcake burger	40
Spring roll	20
Veggie burger	40
Vegetable minestrone	20
Veggie sausage roll	15

Dessert	carbohydrate value (g)
Banana Muffin	20
Black Forest Cake	15
Chocolate Cracknel	35
Chocolate Mousse	55
Sticky Coffee Pineapple Cake	30
Fruit Flapjack	30
Golden Bar	15
Iced Carrot	45
Mississippi Mud Cake	25
St. Clements Sponge	20
Strawberry Cake	20
Strawberry Sundae	15
Tropical Cake	15



Fussy Eating and type 1 Diabetes

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1. You can play a really important part in helping a young person who is a fussy eater to eat a wider range of things – they often eat things at school that they won't eat at home. Having their friends there might make a difference so it is a good idea to keep them in the dining room with them.
2. However, a lot of older children can still be quite fussy and may be embarrassed about this and not tell you that they are leaving food. If they are not supervised in the canteen, this may go unnoticed and not reported.
3. The effect of not finishing carbs that insulin has been given for is that the glucose levels will drop.
4. A lot of young people are anxious to get outside to play with friends and feel under pressure not to finish meals.
5. Many young people with type 1 diabetes eat more slowly than their peers who do not have type 1. It is not fully understood why this might be but having people carb count every meal, make a fuss about food all the time, watch you while you eat and worry about what you're eating probably all contribute to the picture. Parental anxiety is normal when children don't eat well but when the child has type 1 diabetes, this is heightened and can contribute to a cycle of food refusal or being fussy with food. Children pick up on their parents' desire for them to eat!
6. You can encourage them to eat a wide range of foods that are not carbohydrate based because it doesn't matter whether they leave it or not.

What to do?

1. Ensure you encourage the young person to let an adult know if they don't finish the carbohydrate they counted for at break or lunch time. Try and make it as easy as possible for them to let you know. The more they talk to friends about diabetes, the more likely they will be to also support them with this.
2. Don't panic. You have time as long as they have eaten something. Insulin doesn't reach its peak action for an hour or two.
3. Discuss a replacement food with them- what do they have with them or what is available in the canteen/kitchen?
4. Work out a replacement amount of carbs – explanation below
5. If the young person doesn't want to eat anything else/doesn't feel well you can use fruit juice or Lucozade or Dextrose tablets to get the carbs into them.
6. Replacing Carbs – calculation

If you estimate that the young person you are supporting has left about 20g carbs on their plate and they are saying they can't eat any more but would drink some orange juice...

How do you work out the volume of orange juice:

Work out the carbs in 1g/ml of juice – divide carbs in a set weight by that set weight – e.g.

Carbs & cals 13g carbs in 150ml orange juice

Carbs per ml = $13 / 150 = 0.086$

If you want 20g carbs then divide 20 by the grams per ml

$20 / 0.086 = 232.6\text{ml}$ (round up to 235ml)

If you have a carton that is 200ml and gives 17g carbs this is close enough

