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CARBOHYDRATE
COUNTING

Carb Counting

The main nutrient in food that affects blood glucose levels is carbohydrate. This booklet will introduce you to counting the amount of carbohydrates in the food you eat, along with matching this with the correct dose of insulin.

What is carbohydrate counting?[1]

Carbohydrate counting is a meal planning method, which allows you to match your insulin doses to the different types and amounts of carbohydrates you eat. If you know which foods contain carbohydrates and you know the amount of carbohydrates you are eating, then you can enjoy a greater variety of meal and snack choices (including sugar and sugar-containing foods) which will still keep your blood glucose levels within the correct range.

Why count carbohydrates?[1]

Carbohydrates (starches and sugars) account for most of the glucose in the bloodstream, especially right after meals. In fact, 90 to 100% of the digestible carbohydrates we eat appear in the blood as glucose within 15 minutes to 2 hours after they are eaten. In other words, blood glucose levels are mainly increased by foods containing carbohydrates.

The more carbohydrates you eat, the higher the blood glucose level rises. Counting carbohydrates allows you to measure the impact a meal could have on your blood glucose level. For example, 2 slices of bread will make your blood glucose level go higher than 1 slice, while 3 slices will make it go higher than 2.

When you eat carbohydrates, insulin is required to transport the glucose out of the bloodstream and into the body's cells. This means that the more carbohydrates you eat the more insulin you need and the less carbohydrates you eat, the less insulin you need.

The insulin dose will need to match the amount of carbohydrates eaten. Eating too many carbohydrates, however, will result in larger doses of insulin being required and high levels of insulin may cause carbohydrates to be stored as fats (i.e. cause weight gain) and may stop your body from burning its own fat stores (i.e. prevent weight loss).

What is your goal?[2]

Checking your blood glucose before and a while after a meal will help you know if your food choices are working to keep your blood glucose in range. General blood glucose targets for adults:

▶ Before meals | 80 – 130 mg/dL (4.4 - 7.2 mmol/L)
▶ After meals | <180 mg/dL (<10 mmol/L)

Your ideal target range is specific for you and will be agreed with your healthcare team. Write yours down below:

Your target range:

Before a meal (preprandial): _____

2 Hours after a meal (postprandial): _____

You can use the mySugr diabetes management app* to keep track of the changes in your blood glucose levels after meals. Using photos in mySugr not only makes it easier to learn from your data but also helps train your eye to count carbs more accurately.

*Please visit our website to find out if the mySugr app is available in your country and whether your phone is compatible with the app.

What foods contain carbohydrates?[1]

Carbohydrates are found in starches and sugars. (Sugars may be added to food or may be naturally present in foods.) The following foods contain carbohydrates:

Starches		▪ Bread, bread rolls, crackers ▪ Breakfast cereals and porridge ▪ Rice, pasta, couscous, pearled wheat, samp ▪ Mealies, sweet corn ▪ Potatoes ▪ Sweet potato ▪ Dried or canned legumes such as beans, lentils and peas ▪ Anything made from flour e.g. pizza, cake, muffins etc.
Sugars	**Fructose** (Fruit sugar)	▪ Fruit (fresh, dried, tinned) ▪ Fruit juice
	Lactose (Milk sugar)	▪ Milk (plain and flavoured) ▪ Yoghurt and drinking yoghurt ▪ Ice cream *Note: Cheese contains very little carbohydrates*
	Sucrose (Table sugar)	▪ White sugar, brown sugar, icing sugar ▪ Syrup, honey, jam ▪ Sweets, chocolates, cakes, tarts, biscuits, puddings and desserts ▪ Regular cold drinks or sport drinks ▪ Ice cream, flavoured yoghurt and flavoured milk

Are some carbohydrates better for me?[1,3]

In a healthy meal plan, most carbohydrates should come from nutrient-dense foods like whole grains, legumes, fruits, vegetables and low-fat dairy products. Nutrient-dense foods contain a high volume of vitamins, minerals and fibre.

Some sugary foods can be included in your meal plan but should be limited as they are often high in fat and calories (such as cakes, biscuits, pastries and chocolates) and they include very few of the healthy nutrients. Eating these foods too often may result in weight gain and higher lipid (blood fat) levels.

Not all the carbohydrates are digested in the same way; **different carbohydrate foods have different effects on blood glucose levels.** This "difference" is called Glycaemic Index or GI. The GI thus tells us on a scale from 1 to 100 what effect a carbohydrate-containing food will have on blood glucose levels.

For example, the GI of glucose is taken as 100, since it causes the greatest and most rapid rise in blood glucose levels. All other foods are rated in comparison to glucose. The closer the value of a carbohydrate-containing food is to zero, the slower it is absorbed into the bloodstream.

High GI (quick release) carbohydrates	These are **digested and absorbed very quickly** causing a steep rise in blood glucose levels. A lot of insulin is required to bring glucose levels back to normal. These foods are **useful in situations where a patient needs to raise their blood glucose quickly** e.g. hypoglycaemia or during and after strenuous exercise.	Examples: • White or brown bread and rolls • Products made from white flour e.g. scones, pancakes, biscuits, cakes • Refined cereals e.g. Corn Flakes • Rice cakes, cream crackers and cracker bread • Sugar, and sugar-containing foods e.g. sweets, chocolates, cold drinks • Honey and syrup • Crisps
Low GI (slow release) carbohydrates	These are **digested and absorbed slowly but steadily** and produce gradual rise in blood glucose levels. Less insulin is needed to take up this type of carbohydrates. These foods should form the basis of the meal plan. These types of carbohydrates are especially **useful before exercise and as a bedtime snack.**	Examples: • Wholegrain and seeded breads. • Wholegrain crackers • High-fibre cereals e.g. bran flakes • Oat bran • Starches such as durum wheat pasta, brown rice, pearled barley, pearled wheat, mealies, sweet potato • Popcorn • Fruit and vegetables • Legumes such as dried beans, peas and lentils • Reduced fat dairy products

Even though the type of carbohydrate (i.e. high GI vs. low GI) consumed is important, the amount that is consumed remains the most important factor in blood glucose control. Use common sense and indulge in moderation! Carbohydrate counting will help you decide how to include these foods in your meal plan.

How many carbohydrates do I need?[1]

The amount of carbs you need depends on a few factors, such as:
▶ Your weight
▶ How active you are
▶ What, when and how often you like to eat
▶ What and how much diabetes medicine you take and when you take it
▶ Your blood sugar control
▶ Your cholesterol control

Work with a registered dietitian or a diabetes educator to decide how much is right for you. A dietitian can provide a meal plan that helps meet your energy needs and your diabetes self-care goals.

What about protein and fat?[1]

If your blood glucose goals are not being achieved when counting carbohydrates alone, or if you eat larger than usual amounts of protein, then you will need to do a blood glucose test before the next meal to determine the effect of the protein.

Fat has no direct effect on the blood glucose level and that is why you do not actually have to count it. However, it does affect the blood glucose level indirectly by slowing the emptying of the food from the stomach.

It is important for you to know, however, that many foods that contain proteins and fats also contain carbohydrates, which means that they still need to be counted (e.g. crumbed fish or chicken).

Note: Even though fat and protein do not contain carbs, they have calories that cause weight gain if you eat too much.

Here are some healthy fat options to include in your meal plan:
▶ Avocado, avocado oil
▶ Olives, olive oil
▶ Rapeseed oil (canola)
▶ Nuts and nut butter

Here are some protein options to include in your meal plan:
▶ Meat and poultry with excess fat removed
▶ Fish
▶ Eggs
▶ Nuts and nut butters
▶ Seeds e.g. sunflower seeds, sesame seeds, pumpkin seeds
▶ Legumes (e.g. dried beans, canned beans, lentils and dried peas)
▶ Soya products
▶ Dairy products (milk, yoghurt, and cheese)

Let's practice:

Select the foods below that contain carbohydrates:

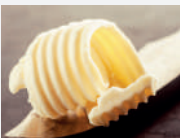| Avocado	Cheese	Spinach	Bread Crumbed Fish	Egg
Y N	Y N	Y N	Y N	Y N

Butter	Mealies (Corn)	Fruit Juice	Nuts	Potatoes
Y N	Y N	Y N	Y N	Y N

Let's try some more examples:

Tick the foods in each meal that contain carbohydrates:

Meal 1	
Bran cereal	
Low fat milk	
Artificial sweetener	
Strawberries	

Meal 2	
Egg	
White toast	
Fried tomato	
Fried mushroom	
Tomato sauce	

Meal 3	
Burger bun	
Beef patty	
Fried chips	

Meal 4	
Chicken breast strips	
Salad (tomatoes, cucumber, lettuce)	
Brown rice	
Mayonnaise	

Meal 5	
Low GI brown bread	
Margarine	
Peanut butter	
Apple	
Low fat plain yoghurt	

Drinks	
Coke Zero	
100% Orange juice	
Iced tea	
Coffee with no milk	
Flavoured sparkling water	
Energy drink (e.g. Red Bull)	
Tea with sugar	

Snacks	
Biltong	
Nuts	
Muffin	
Fruit bar	
Cheese	
Crisps	

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How to count carbohydrates[1]

There are two basic methods of counting carbohydrates. Many people use a combination of both methods:

1. The Carbohydrate Exchange System
2. Carbohydrate Gram Counting

1. The Carbohydrate Exchange System

This method uses food groups called "exchanges" (or portions). Food exchange lists assign an average carbohydrate value per exchange to all the foods within a food group. One exchange or carbohydrate portion contains ±15g of carbohydrates. E.g. 1 starch exchange/1 fruit exchange/1 starchy vegetable exchange = 15g of carbohydrates. Dairy exchanges are the only exception with only 12g of carbohydrates and not 15g.

Food group	Grams of carbohydrate	Exchange	Examples
Starches	15g	1	1 slice of bread ½ cup of cereal
Fruit	15g	1	1 medium apple 1 small banana
Milk	15g	1	300mL milk
Non-starchy vegetables	5g	⅓	1 cup tomato and cucumber salad
Fats	0g	0	1 teaspoon oil ¼ small avocado
Protein	0g	0	1 egg ½ tin tuna

Because exchange values are averages, they are not accurate for every food in a group. If blood glucose goals are not being met, try the more precise carbohydrate gram counting method. Appendix 1 has a list of foods with their approximate carbohydrate content.

15g   15g   15g
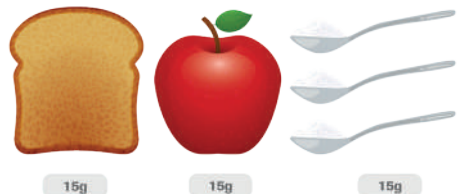
2. Carbohydrate Gram Counting

Another way to count carbohydrates is to add up the exact number of grams of carbohydrates in each meal or snack. Food labels and reference books are great tools for this method.

16g   28g   33g

Tools needed for carb counting

Weighing and Measuring Equipment

Truly accurate carb counting requires some weighing and measuring equipment, such as a gram scale and measuring cups and spoons.

Nutrition Reference Books and Recipe Books; Internet or Apps

There are a couple of nutrition books with lists of food with the amount of carbohydrate in a typical serving size of each food. If you enjoy cooking, you can also buy recipe books that note the amount of carbohydrate in a dish. There are several internet websites and apps that come in handy if you do not have a book with you. Several take-away restaurants also have lists of the nutritional content of their meals on their websites.

Food Nutrition Labels

Almost all packaged foods today have a "Nutritional information" label. Besides providing nutritional information, including the number of kilojoules and the grams of protein and fat, they also give the exact number of grams of carbohydrates contained in a serving and the size of this serving.

Use these steps when looking at a label:

→ Step 1: Look for the **serving size.** If you are going to eat a different serving to what is indicated on the label you will need to make a couple of calculations.

→ Step 2: Look for the **total carbohydrates** for the serving size.

→ Step 3: Decide on **how many servings** you are going to eat.

→ Step 4: **Multiply** the number of servings you are going to eat by the grams of total carbohydrates per serving. This will give you the total number of grams of carbohydrate for the quantity of food that you are going to eat.

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Here is an example:

Nutritional information – Low GI seeded brown loaf		
Typical composition **Serving size = 1 slice (50g)**	**Per 100g**	**Per serving**
Energy	964kJ	482kJ
Protein	8.6g	4.3g
Total carbohydrate	32g	16g
Of which: Sugars	1.9g	0.95g
Total fat Of which: Saturated Trans fat Polyunsaturated Monounsaturated Cholesterol	0.3g 0.81g <0.05g 2.9g 1.5g <1.0mg	0.65g 0.4g <0.02g 1.45g 0.75g <1.0mg
Total dietary fibre Of which: Insoluble fibre Soluble fibre	10g 7.8g 2.1g	5g 3.9g 1.05g
Sodium	393mg	195mg

Step 1:	Serving size: 1 slice (50g)
Step 2:	Total carbohydrates per serving: 16g
Step 3:	2 Slices
Step 4:	2 x 16g = 32g

Remember that even foods that say "sugar free" or "no sugar added" might still contain carbohydrates. An example is fruit juice. Fruit juice has no added sugar (sucrose) but naturally contains large amounts of fruit sugar (fructose) which will affect your blood glucose.

Using your hand as a portion guide[4]

When there are no scales or food nutrition facts labels, you can use your hand as a portion guide.

Thumb tip	= 1 Teaspoon (5mL)	Example = 1 Teaspoon of butter or margarine	
Thumb	= 1 Tablespoon (15mL)	Example = 1 Tablespoon of Mayonnaise	
½ Fist	= ½ cup (125mL)	Example = ½ cup of chopped up fruit	
Fist	= 1 cup (250mL)	Example = 1 cup of leafy vegetables	
Palm of hand	= 75 g	Example = 75 g of meat, fish or poultry	
Cupped hand	= ¼ cup (60mL)	Example = ¼ cup of nuts	

The portion sizes here are based on a woman's hand. Hand sizes vary. Ask your registered dietitian or diabetes educator how your hand compares to these estimates.

Build your own food database

Put together a personal food database, which could be a journal or notebook or an online database, of your favourite things to eat. This list you can keep handy on your fridge at home and in your wallet/purse.

How to build your food database:
▶ Make a list of foods you regularly eat. Think breakfast, lunch, dinner, and snacks. Look at what is in your refrigerator, freezer, pantry and on your shopping list.
▶ Think about portions. Record the amounts or portion sizes you usually eat and look up the carb content of the foods in these portions.
▶ Combine the foods into meals and add up the total carbs.
▶ Include new foods as you add them to your repertoire.

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Steps to successful carbohydrate counting:

		Example: *Meal: Bran Flakes with low fat milk and a banana*
Step 1:	Identify the carbohydrate-containing foods on your plate	▪ Bran Flakes ▪ Milk ▪ Banana
Step 2:	Measure the amount of food that you are eating – you can use a food scale, cup measure, measuring jug etc.	▪ Bran Flakes – 40g (1 cup) ▪ Milk – 250mL (1 cup) ▪ Banana – 120g
Step 3:	Look up the carbohydrate content – you can use a carbohydrate counting book or read the food label	▪ Bran Flakes – **23g** per 40g (1 cup) ▪ Milk – **12g** per 250mL (1 cup) ▪ Banana – **20.5g** per 100g
Step 4:	If the reference gives the amount of carbs for a 100g portion, and your portion is different, use the following formula to calculate the quantity of carbohydrates: Total weight (g)/100 x carbohydrate content of food per 100g	▪ Banana: 120g/100g x 20.5g = **24.6g**
Step 5:	Add the total amount of carbohydrates in grams.	▪ 23 + 12 + 24.6 = 59.6g
Step 6:	Calculate the insulin bolus needed for the meal according to your personal insulin to carbohydrate ratio. (Appendix 2 on page 24 will give you more information on this).	
Step 7:	Discuss with your healthcare professional when you should check your blood glucose so that you can evaluate how well you covered your carbohydrates with your insulin bolus.	

What should I eat each day?

While counting carbs is important, good health depends on eating a variety of foods. Use these tips to guide you:

▶ Build your meals around healthy, fibre-rich whole grains, beans and starches.

▶ Strive for at least two servings of fruits and two to three servings of non-starchy vegetables every day.

Note: Most vegetables are non-starchy. Common starchy vegetables include potatoes, corn, peas, baked beans, and sweet potatoes. If you eat these or other starchy vegetables, you are adding more carbs. Keep this in mind when you count your total carbs.

▶ Include small portions dairy products, lean meat and meat substitutes.

▶ Use fats and oils in small amounts.

▶ Small amounts of sweets may be included as long as the carbs are counted.

Talk with your registered dietitian or diabetes educator about the amounts of each that best meet your needs.

Summary

Carbohydrate counting can be a successful meal planning method to help you manage your diabetes. It allows you to match your insulin doses to the different types and amounts of carbohydrates you eat.

It offers the most precise and flexible approach available today, is relatively easy to learn and use, and can add a lot of freedom to food choices. It takes some time and practise, but if you are persistent, you will become an expert and see the results you want over time.

Appendix 1: The Carbohydrate Exchange System[5]

Remember that all the amounts shown here are approximates for the sake of simplicity.

Serving size	Measurement
1 cup	250mL
½ cup	125mL
1 Tablespoon	15g
1 Teaspoon	5g

BREAD All of the breads listed below are pre-sliced		
Food	**Portion**	**Carbohydrates (g)**
Bread, white, brown, seeded, multi-grain, low GI	1 slice	15
Hotdog rolls	½ roll	15
Hamburger rolls	½ roll	15
Pita Bread	½ - ⅓ pita (30g)	15
Roti	⅓ - ½ roti (30-40g)	15
Bagel	⅓ (30g)	15
Naan Bread	½ small naan (30g)	15
Focaccia Bread	¼ medium (30g slice)	15
Ciabatta bread	⅓ of a regular	15
Tortilla (Corn or Flour)	1 x 15cm across	15

CRACKERS			
Food		**Portion**	**Carbohydrates (g)**
Provita	Wholegrain, Multigrain, Oats and Brown Sugar	4 crackers	15
Ryvita	Dark Rye, Original, Sesame	2 crackers	15
Finn Crips	Thin Crips – Original Thin crisps – Original rye	3 crackers	15
Pyotts	Hi-toast Crackerbread – Original Salticrax – Salted Crackers – Original Cream Crackers	3 crackers	15
Vital	Vital Corn Cakes – Original Vital Rice Cakes	2 crackers	15
Real Foods	Corn Thins - Original	3 crackers	15
Matzo		½ large/2 small	15

DAIRY		
Food	**Portion**	**Carbohydrates (g)**
Milk – Full Cream, Low Fat (1% and 2%), Fat Free (Skim)	300mL	15
Flavoured yoghurt	100mL	15
Plain yoghurt	175mL	15

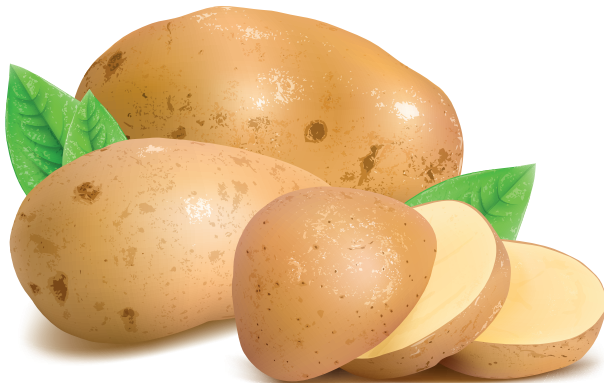| CEREALS AND PORRIDGES		
Food	**Portion**	**Carbohydrates (g)**
All-Bran Flakes	30g (¾ cup)	15
Corn Flakes	20g (½ cup)	15
Rice Krispies	20g (⅔ cup)	15
Special K	20g (½ cup)	15
Weet-Bix	20g (1 biscuit)	15
Maltabella (Traditional and Quick Cooking)	20g (45mL uncooked)	15
Future Life – High Energy Smart food	35g (50mL)	15
Future Life – High Protein Smart food	40g (62mL)	15
Future Life – Zero Smart Food	30g (45mL)	15
Future Life – Crunch	26g (40mL)	15
Vital Muesli - Original	25g	15
Oats and Oat bran, cooked (All brands)	160g (¾ cup)	15
Oats and Oat bran, raw (All Brands)	30g (⅓ cup)	15
Mealiemeal Porridge, cooked　　Stiff　Crumbly　Soft	75g (¼ cup) 45g (½ cup) 130g (½ cup)	15
Mabele, dry	20g (¼ cup)	15
Mageu Nr. 1, Plain	½ x 500mL carton	15

LEGUMES/PULSES		
Food	Portion	Carbohydrates (g)
Soya beans, canned or cooked	300g (1 ½ cup)	15
Beans, canned or cooked: Barlotti, Broad, Butter, Haricot, Brown, Sugar, Kidney, Mixed, Cannelloni, White, Black eyed	75g (⅓ cup)	15
Baked beans in tomato sauce	75g (⅓ cup)	15
Lentils, canned or cooked	105g (½ cup)	15
Split peas, canned or cooked	105g (½ cup)	15
Chick peas, canned or cooked	100g (½ cup)	15

GRAINS		
Food	Portion	Carbohydrates (g)
Barley, pearled, boiled	½ cup	15
Bulgar wheat, cooked	⅔ cup	15
Pearled wheat (stampkoring), cooked	½ cup	15
Pasta, cooked	½ cup (60g)	15
Lasagna sheets	2 sheets (60g)	15
Two minute noodles *check difference between brands	¼ packet	15

Rice: Brown, wild
          White, basmati, Arborio
          Jasmine
	½ cup
	⅓ cup
	¼ cup
		15

Couscous, cooked	½ cup	15
Quinoa, cooked	⅓ cup	15
Samp, cooked	⅓ cup	15
Samp and beans, cooked	⅓ cup	15

POTATOES AND SWEET POTATO		
Food	Portion	Carbohydrates (g)
Baked/microwaved/roasted	½ medium (65g)	15
Mashed	½ cup (120g)	15
Fried or oven chips	7 – 10 (50g)	15
Baby/new	3 (100g)	15
Sweet potato	70g	15

STARCHY VEGETABLES		
Food	Portion	Carbohydrates (g)
Carrots - raw	4 Carrots (220g)	15
Carrots - cooked	1 cup	15
Green peas - cooked	1 cup	15
Beetroot	¾ cup	15
Butternut	1 cup	15
Pumpkin (Hubbard Squash)	1 cup	15
Marog	1 cup	15
Mixed vegetables with corn, peas and potato	1 cup	15
Sweet corn	½ cup (160g)	15

FRUIT		
Food	**Portion**	**Carbohydrates (g)**
Apple	1 small	15
Apricots	4 small	15
Banana	1 small/½ large	15
Berries: Blackberry, raspberry, youngberry, blueberries	1 cup	15
Cherries	10 small	15
Figs	2 medium	15
Grapefruit	1 small/½ large	15
Grapes	10 small	15
Granadillas	4 small	15
Gooseberries	2 cups	15
Guava	1 average/2 small	15
Kiwi fruit	2 small	15
Lemon	2 medium	15
Litchis	6	15
Mango	⅓ (100g)	15
Melon	1 cup cubed	15
Naartjie	1 medium	15
Nectarine	1 medium	15
Orange	1 small/½ large	15
Papaya/Papino/Pawpaw	1 cup cubed/ ½ papino	15
Pear	1 small	15
Peach	1 medium	15
Pineapple	¾ cup cubed/ 3 slices (1cm each)	15
Plum	2 medium	15
Prickly pear	2	15
Strawberries	300g	15

FRUIT		
Food	**Portion**	**Carbohydrates (g)**
Watermelon	1 cup cubed	15
Fruit salad	½ cup	15

DRIED FRUIT		
Food	**Portion**	**Carbohydrates (g)**
Apple	4 rings	15
Apricot	6 halves	15
Cake mix	2 Tablespoons	15
Cranberries	1 ½ Tablespoon	15
Dates	3 small	15
Figs	2	15
Mango	4 strips	15
Mixed fruit salad	3 halves	15
Peach	2 halves	15
Pear	2 halves	15
Prunes	3	15
Raisins/Sultanas/Currants	1 ½ Tablespoon	15
Safari Just Fruit Fruit Bar (all flavours)	¾ x 32g bar	15
Woolworths – Slimmer's Choice Fruit bar (all flavours)	1 bar (18g)	15
Fruit flakes	20g	15
Fruit roll - sweetened (Safari), apricot, guava, mango, peach	¼ roll (20g)	15

CANNED FRUIT		
Food	**Portion**	**Carbohydrates (g)**
Canned fruit in fruit juice	½ can drained	15
Canned fruit in syrup	¼ can drained	15

CONDIMENTS AND BREAD SPREADS		
Food	**Portion**	**Carbohydrates (g)**
Chutney	2 Tbsp.	15
Tomato sauce e.g. All Gold	4 Tbsp.	15
Corn flour (Maizena)	2 Tbsp.	15
Gravy powder (e.g. Bisto)	2 Tbsp.	15
Marmalade	½ tsp	15
Honey	1 heaped tsp	15
Jam	1 heaped tsp	15

Create your own custom food list here.

CUSTOM FOOD LIST		
Food	**Portion**	**Carbohydrates (g)**

Appendix 2: Insulin Boluses

Let's look at the different types of insulin boluses that you need to manage your blood glucose levels.

Meal/carbohydrate bolus

A meal bolus is the injection of rapid acting insulin delivered to match carbohydrates in an upcoming meal or snack.

The amount of insulin required to cover a given number of carbohydrates is called the "insulin-to-carbohydrate ratio". There is a unique, personal ratio between the amount of insulin you need to "match" or "cover", the amount of carbohydrates you eat. This ratio can be used to calculate the appropriate dose for any meal or snack. Your healthcare team will help you work out the correct insulin-to-carbohydrate ratios that are appropriate for you.

For example: If your insulin-to-carbohydrate ratio is 10g it means that 1 unit of insulin will cover 10g of carbohydrates. Thus, if you eat 20g of carbohydrates you will need to inject 2 units of insulin.

> **Your personal insulin–to–carbohydrate ratio**
>
> 1 Unit of insulin will cover _____ grams of carbohydrates.

Correction bolus

When your blood glucose goes unexpectedly high, a correction bolus can be used to bring it down.

Your insulin sensitivity factor (ISF) is the amount (in mmol/L or mg/dL) that your blood glucose level is reduced by one unit of rapid-acting insulin. The insulin sensitivity factor helps you decide how much insulin you need to get elevated blood glucose levels back into target range. Because everyone is different, your ISF should be tailored for your specific needs. Trial-and-error and keeping detailed records, will help you and your diabetes team, work out your insulin sensitivity factor.

For example: If your insulin sensitivity factor is 2.0 mmol/L (36 mg/dL) it means that 1 unit of insulin will drop your blood glucose by 2 mmol/L (36 mg/dL).

Your personal insulin sensitivity factor

1 Unit of insulin will drop your blood glucose by _____ mmol/L or mg/dL.

Accu-Chek® Instant, Accu-Chek® Active, Accu-Chek® Guide and Accu-Chek® Guide Me can be used for monitoring your blood glucose levels.

For more information contact your healthcare professional.

References
1. The Complete Guide to Carb Counting, 4th Edition: Practical Tools for Better Diabetes Meal Planning by the American Diabetes Association.
2. Glycemic Targets: Standards of Medical Care in Diabetes—2020. American Diabetes Association, Diabetes Care 2020 Jan; 43(Supplement 1): S66-S76.
3. The Glycaemic Index Foundation. What is GI? Available from: https://www.gisymbol.com/about-glycemic-index/.
4. Eat Right Ontario. Handy Guide to Serving Sizes. Canada's Food Guide Serving Sizes. 2018. Available at: http://www.unlockfood.ca/EatRightOntario/media/PDFs-new-website/Portions%20Toolkit/Handy-Servings-Guide-EN-v04-July -2018.pdf.
5. Steenkamp G, Delport L. The South African Glycemic Index and Glycemic Load Guide. GIFSA: 2007.