

A guide to flexible insulin therapy for families

Purpose of this guide

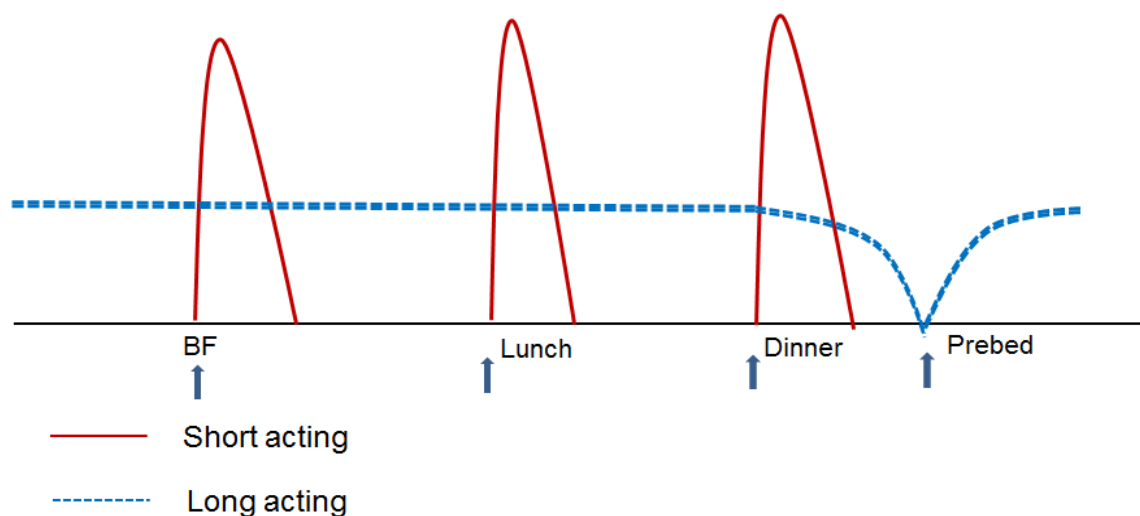
This guide is for people with Type 1 Diabetes on flexible insulin therapy. The purpose of this information is to explain flexible insulin therapy so that you are able to self-manage from home.

While this guide can be used to assist you, if you are ever unsure about what adjustments should be made, please speak with your diabetes team at clinic or through the triage phone service.

What is Flexible Insulin Therapy?

Flexible Insulin Therapy (also known as multiple daily injections), is designed to mimic the normal production of insulin by the pancreas. It is popular because it can provide some flexibility for varying lifestyles.

It consists of a “bolus” of fast-acting insulin before each meal or large snack, with long-acting insulin (Lantus) given once a day to provide background or “basal” insulin requirements between meals and overnight.



Using flexible insulin therapy with carbohydrate counting will help you to keep your blood glucose levels within range as much as possible. You will be able to adjust your fast acting insulin daily to balance the carbohydrate in your meals. It can also help you manage other aspects of everyday life, such as sport, stress or illness.

The amount of fast acting insulin to be given changes based on carbohydrates to be consumed, your insulin to carb ratio and your insulin sensitivity.

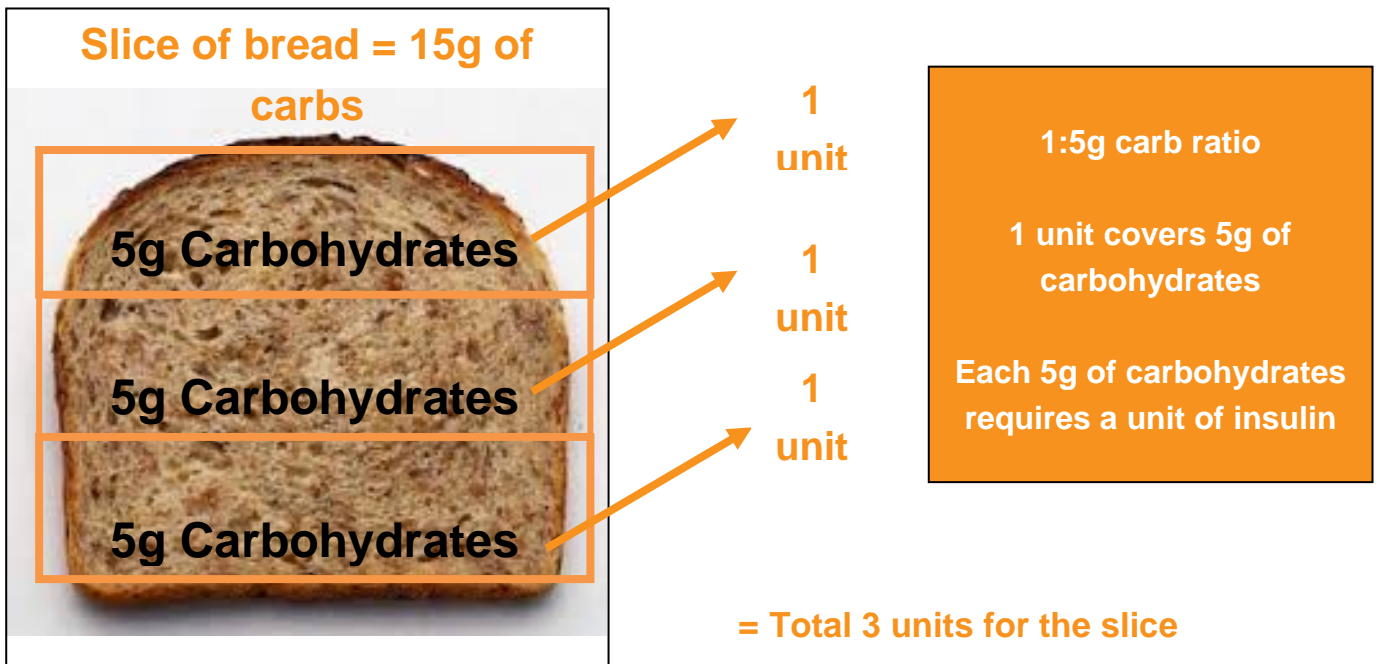
What is a carbohydrate ratio?

Insulin to carbohydrate ratio (ICR) is the number of grams of carbohydrates that is covered by 1 unit of insulin. This ratio varies amongst people and can be affected by the time of the day, and changes in weight, age, exercise and other factors.

Below is an example of two different ICR's applied to the same food.

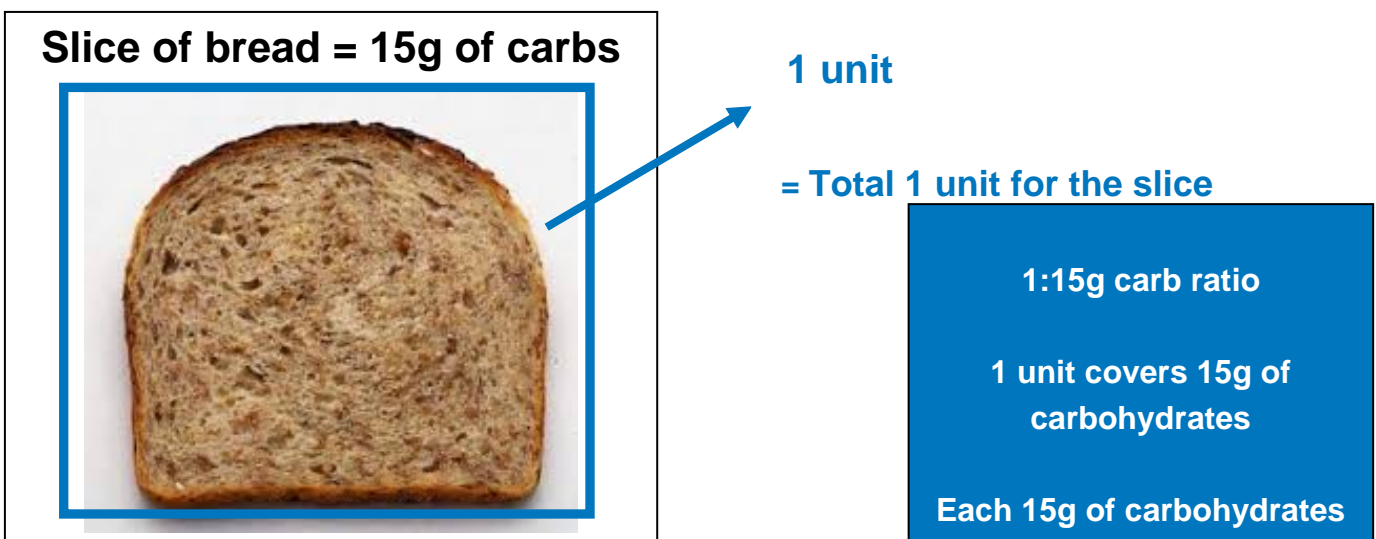
This person uses an ICR of 1:5g

This means each 5g of carbs in this slice of bread requires a unit of insulin. Therefore this slice of bread which is 15g of carbs needs 3 units.



A different person uses an ICR of 1:15g

This means 1 unit will cover 15g or the whole slice of bread and the insulin dose will be lower.



As demonstrated on the previous page, the **lower** the number in the ICR the **larger** the insulin dose. The aim is that 2 – 3 hours after a meal the blood glucose levels should be no more than 2mmol/L higher than before the meal.

To get a general idea of what the ICR should be, the **500 rule** is used. The 500 rule starts with 500, and divides the average amount of insulin given over the last 5 days.

For example: if the average daily dose of insulin over the last 5 days is 50 units:

Calculation is 500 divided by 50

$500 / 50 =$ carbohydrate ratio of 10.

In children under 5 years the **300 rule** can give a more accurate idea of the ICR. The **300 rule** can also be more useful in children and adolescence through puberty.

Your diabetes team will help you work out your carb ratio because everyone is different.

Provides highest dose of insulin	Insulin : CHO ratio (g)
	1.5
	2
	3
	4
	4.5
	5
	6.5
	7.5
	8
	10
	12
	15
	20
	25
	30
	35
	40
	45
	50
	55
	60
	65
Provides lowest dose of insulin	

My **current** insulin to carbohydrate ratio is _____

If my BGL is high 2 hours after the meal requiring more insulin, change to the _____ ratio.

If my BGL is low 2 hours after the meal requiring less insulin, change to the _____ ratio.

What is insulin sensitivity?

Insulin sensitivity is also known as a correction factor. It controls how much extra insulin should be given for a high blood glucose reading in order to bring your blood glucose levels into range (4 – 8mmol/L) after 2 – 3 hours.


For example, a sensitivity of 2 means that 1 unit of insulin will lower the blood glucose by 2mmol/L. So if your BGL was 10mmol/L and you injected one unit, your BGL would later be 8mmol/L.

The lower the sensitivity number– the more insulin will be given for a correction

To get a general idea of what the insulin sensitivity factor is, the **100 rule** is used. The 100 rule is starting with 100, and dividing the average amount of insulin given over the last five days. For example if the average daily dose of insulin is 50. Calculation is 100 divide 50.

$$100 / 50 = \text{insulin sensitivity of } 2$$

You can see if your sensitivity is correct by looking at your record book. Look at days when you have had a high BGL before a meal and see what happened 2-3 hours later. You can also look at times when you have had to give insulin without any food to correct a high level. If it over or under corrects the insulin sensitivity needs to be changed.

	Sensitivity/Correction factor (mmol/L)
<p>Provides highest dose of insulin</p>  <p>Provides lowest dose of insulin</p>	1
	1.3
	1.5
	2
	2.5
	3
	3.5
	4
	4.5
	5
	6
	7
	8
	9
	10
	12
	14
	16
18	

My **current** insulin sensitivity is _____ mmol/L.

For more insulin for corrections due to high BGL's change to _____ mmol/L.

For less insulin for corrections due to low BGL's change to _____ mmol/L.

Calculating your dose of insulin

When you apply a carb ratio and insulin sensitivity your pre meal insulin dose will change frequently. Meters and apps are available which allow you to program different carb ratios and sensitivities at different times of the day to help you calculate your insulin dose.

It is common that as your insulin to carb ratio changes so may the insulin sensitivity, but this is not always the case.

Your carb ratio and insulin sensitivity should be regularly reviewed. **It is important to remember that the blood glucose target is 4 – 8mmol/L.**

Tips for changing insulin

- Look at times of the day separately; different insulin to carb ratios and sensitivities across the day is very common
- Look at BGL's 2 – 3 hours after your meals
- Remember target blood glucose levels are 4.0 – 8.0 mmol/L
- Make sure you are carbohydrate counting correctly before making changes
- Look at patterns over three days. Do not change insulin based on one high or low level
- A glucose level outside of target at the same time of the day on multiple occasions (minimum 3 times) may suggest a change is needed to your carb ratio and or sensitivity
- During the “honeymoon phase” your body begins to produce some of its own insulin and insulin requirements can change very quickly. During the “honeymoon phase” changes may be made sooner before the suggested trend of three levels. Please speak to your diabetes team.

When do I need to change the Lantus dose?

- The Lantus dose is the background insulin that is active throughout the whole day
- Lantus keeps your BGL's at a relatively similar level between going to bed and waking in the morning
- If your blood glucose levels are regularly dropping by 4mmol/L or more between going to bed and waking then the Lantus needs reducing by 1-2 units
- If your levels are regularly rising by more than 4mmol/L between going to bed and waking you may need to increase Lantus by 1 – 2 units
- For example if your BGL's were 8mmol/L before bed and waking levels were 12mmol/L or more without having any carbohydrates then more Lantus may be needed.

If you are unsure, please call PCH between 8:30am – 4:30pm on 6456 2222 (PCH Switchboard), press 2 to speak with a diabetes educator and leave a message with your child's name and your preferred contact number.



Government of **Western Australia**
Child and Adolescent Health Service

**This document can be made available in alternative formats
on request for a person with a disability.**

Child and Adolescent Health Service

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