

## Cystic Fibrosis related diabetes

### What is cystic fibrosis related diabetes?

Cystic Fibrosis related diabetes (CFRD) occurs in around 30% of people with Cystic Fibrosis (CF) by the age of 25. CFRD is a condition where the amount of glucose (sugar) in the blood is too high. The pancreas normally releases a hormone called insulin to control the amount of glucose in the blood. In CF the pancreas may not work properly and can stop producing enough insulin, leading to high blood glucose levels. In addition to this, the insulin that is still being produced by your body does not work as well.

CFRD is different from other types of diabetes. The management of your diabetes may be different from other people with diabetes. People with CF can have episodes of high blood glucose levels due to infection or oral steroid use. This may be temporary and resolve when the infection is treated or the steroids are reduced or stopped. It may progress to CFRD, so you will need to check your blood glucose levels over a period of time to see if you need treatment.

### Complications of untreated CFRD

In the short term, untreated CFRD can lead to weight loss, malnutrition, decrease in lung function and more severe respiratory infections. High blood glucose levels can make sputum thicker and more difficult to move. In the long term, poorly controlled CFRD can cause damage to the eyes, kidneys, nerves and blood vessels.

### Dealing with a new diagnosis

It is very common for people to feel overwhelmed with a new diagnosis of CFRD. Any new medical diagnosis has an emotional impact, and when it is on top of an existing chronic condition the effects can feel enormous. Common questions and concerns are:

- *“How much more treatment?”*
- *“How will I fit it all in?”*
- *“What does this mean for my long-term prognosis?”*

If you feel like this, you are not on your own. Members of your CF Team will have come across this before, and will be able to offer you the support you need.

### **Monitoring blood glucose levels**

You will need to check your blood glucose levels regularly. Your CF team recommends that you check your blood glucose levels at the following times:

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Remember to record your blood glucose levels in your diary or app and take this with you to all clinic appointments.

### **Blood glucose targets**

Generally, ideal blood glucose levels before meals is between 4 and 6mmol/L and less than 8mmol/L 2 hours after meals. These goals may vary during periods of infection and between different individuals. Your CF team will advise you on your targets.

### **Treatment**

While some people with diabetes take tablets, CFRD is usually best treated with insulin injections. Your CF team will advise you on your insulin dose and frequency of injections. You should not restrict the food you eat if your blood glucose levels are high. Instead, ask your treating team to review your medication.

### **What should I eat?**

People with diabetes who do not have CF are normally advised to a low fat, low sugar diet to help control blood glucose levels.

People with CF who have CFRD still need to have a high energy, high protein and high fat diet to help achieve and maintain a healthy body weight. Keeping your blood glucose levels in range will also help to maintain or improve your weight.

## **Carbohydrate**

Carbohydrates are one of the building blocks of food. They are the best source of energy for the body. When carbohydrates are digested, they break down to form glucose in the bloodstream. Glucose is then moved out of the blood stream by insulin so that it can be used for energy by the muscles and body.

### **How does carbohydrate affect my blood glucose levels?**

It is the carbohydrate in food that directly affects blood glucose levels. It is important to continue eating carbohydrate foods. Having regular meals and spreading your carbohydrate foods through the day can help you manage your blood glucose levels. If you take insulin it is important to include carbohydrate foods with your meals to prevent a hypo.

### **What are carbohydrate foods?**

- Dairy including milk, yoghurt and custard (not cheese)
- Fresh, dried and canned fruit or fruit juice
- Starchy vegetables (potato, corn, legumes)
- Cereals and grains (bread, pasta, rice, noodles, biscuits, cakes)

### **Foods with very little or no carbohydrate**

Some foods contain no or very little carbohydrate and therefore will not increase your blood glucose levels. These include:

- Some fruits: lemon, lime, passion fruit, berries. All other fruits contain carbohydrates.
- Vegetables: all salad and non-starchy vegetables like lettuce, cucumber, broccoli etc.,
- Protein foods: meat, chicken, fish, eggs, nuts and cheese.
- Fat-based foods: including margarine, oils, peanut butter, avocado, mayonnaise, salad dressings.

Carbohydrate free foods can be a good snack option if you do not want to take insulin for snacks. They can also be used to bulk out your meals without affecting your blood glucose levels.

## 1 Carbohydrate Portion (CP) = 15g Carbohydrate

### Dairy Food (except cheese and cream)



1 cup (250ml)  
milk



½ cup (150ml)  
flavoured milk



½ tub  
flavoured  
yoghurt (100g)



1 200g tub  
natural/diet  
yoghurt  
(check label)



½ cup custard



1 large scoop  
ice-cream (130  
ml, 70g)

### Fruit



1 medium  
apple/orange/  
pear (160-175g)



3 small apricots



1 small banana  
(120g)



20 grapes/  
cherries



¾ cup fruit  
salad



150ml juice

### Starchy Vegetables



½ cup boiled or  
100g raw sweet  
potato



½ cup mashed  
/1 raw medium  
(120g) potato



½ cup boiled/  
65g raw taro



⅓ cup boiled/  
50 g raw  
cassava

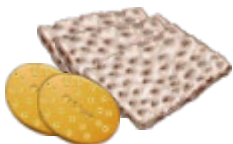


½ cup corn or  
medium cob



½ cup baked  
beans/ kidney  
beans/ lentils

### Breads, Cereals, Biscuits, Flour



3 rusks/ 4 vita-  
weat/ 1-2 plain  
biscuits  
(check label)



1 slice of bread  
(35g)



⅓ - ½ cup cereal,  
(check label)  
1 ½ weet bix



¼ - ⅓ cup  
cooked rice,  
½ cup raw  
rice = 5 CP



⅓ - ½ cup cooked  
pasta,  
100g raw pasta  
= 4½ CP

### Extras



12 regular-sized  
hot chips



6 squares of plain milk  
chocolate (30g)



150ml soft drink,  
250 ml cordial



3 tsp honey/sugar

## **Salt replacement drinks**

While salt replacement drinks (such as *Glucolyte*) are high in carbohydrate, it is important to continue to drink these to maintain hydration. Talk to your CF team if these drinks are causing high blood glucose levels. You could try sipping these regularly throughout the day, or adding regular table salt to diet cordial or Gastrolyte to help your blood glucose levels.

## **What about fat?**

Fatty foods are an excellent source of energy. You should continue to eat a high fat diet to help you achieve a healthy weight. When combined with carbohydrate it can slow the absorption of glucose, leading to a delayed rise in your blood glucose levels

As people with CF are not able to absorb fat properly, you are less likely to develop illnesses associated with a high fat diet, such as heart disease. It may be beneficial to your health to use vegetable and olive oils or spreads instead of lard or butter. Remember to adjust your pancreatic enzymes if you are increasing the fat in your diet.

## **What about protein?**

Protein is important for growth, healing and fighting infection. It also helps maintain muscle mass and heal wounds. It is important to include protein rich foods regularly in your diet.

## **What is the Glycaemic Index (GI)?**

GI is a measure of how carbohydrate foods affect blood glucose levels. Low GI foods are broken down slowly by the body and have less effect on the blood glucose levels.

Examples of low GI foods include wholegrain breads and cereals, lentils, legumes, pasta, milk, yoghurt and some fruits.

Including low GI foods may help to control your blood glucose levels. Low GI foods that are also high in energy include: cakes, biscuits, chocolate, crisps, nuts, chips, and full fat dairy milk drinks or custards. Combining fat or protein with carbohydrate can lower the GI of the meal. For example, have pasta with a creamy sauce, or add sour cream to baked potato or wedges.

### **What is hypoglycaemia?**

Hypoglycaemia or a “hypo” means a low level of glucose in the blood (less than 4mmol). Hypos can happen when you take with insulin. Causes include not eating enough carbohydrate, too much insulin, some diabetes medications, unplanned exercise or alcohol.

### **Common hypo symptoms include:**

- Feeling hungry
- Feeling “shaky”
- Sweating
- Being irritable or mood changes
- Feeling weak or tired

It is important to check your blood glucose levels if you are experiencing any of the above symptoms.

If your blood glucose levels are low (less than 4mmol/L) you need to treat this by having something high in sugar. For example, 1/2 a glass of regular soft drink or 6-7 jellybeans. Re-check blood glucose levels in 15 minutes and repeat if blood glucose levels are still low.

For more detail see *Treating hypoglycaemia or “hypos”* resource available online:

[https://www.health.qld.gov.au/nutrition/nemo\\_diab.asp](https://www.health.qld.gov.au/nutrition/nemo_diab.asp)

### **Can I drink alcohol?**

If you have liver problems or if you are taking certain CF medications that interact with alcohol, it may be better not to drink alcohol or limit your alcohol intake. You should always check with your CF Team about whether drinking alcohol is safe for you.

Alcohol can increase the risk of hypoglycaemia if you are using insulin and some types of diabetes medications. Your awareness of hypos can be impaired by alcohol. Your CF team can give you tips to avoid hypoglycaemia.

The recommended amount of daily alcohol intake for adults is 2 standard drinks a day.

One standard drink is equal to:

- 285 mL regular beer, (1 stubbie/ can= 1.4 standard drinks)
- 1 stubbie/ can midstrength beer
- 100 mL wine (the size of wine glasses varies)
- 30 mL spirit (= 1 nip)
- 1 can (250mL) alcopop

### **If you drink alcohol:**

- Make sure you eat carbohydrate foods before (e.g. potato, rice, pasta) and try to have a snack whilst you are drinking (e.g. chips).
- Ask your diabetes team if you need to adjust your insulin dose.
- Limit to two standard drinks of alcohol at any time.
- Check your blood glucose levels more frequently during and after drinking so that you know how alcohol affects you.
- Remember the signs/symptoms of a hypo may be mistaken for being drunk. Make sure you carry some identification that clearly states that you have diabetes.

### **What about nutritional supplement drinks?**

Many people with CF take high energy nutritional supplements which provide a valuable source of energy. Nutritional supplements help people to achieve energy requirements and prevent weight loss, especially during times of infection or illness.

You should discuss with your Dietitian which are the most appropriate supplements for you now that you have CFRD.

### **What about tube feeding?**

Some people require overnight tube feeding (nasogastric or gastrostomy feeding) to help them to gain or maintain their weight. Some people will already know they have CFRD when they commence tube feeding. However, others may only discover they have CFRD when they start tube feeding. If your blood glucose is not well controlled whilst you are feeding you will not get the full benefit of your feed.

If you are on overnight feeds you should check your blood glucose levels before, during and after your feed. This is important because you may require different insulin or more insulin in the evening to cover your feed.

### **What about exercise?**

Regular exercise is good for you for many reasons. It can help to improve your circulation, keep your lungs healthy and help to improve your diabetic control. These are just a few of the benefits of regular exercise. Your CF physiotherapist can advise on the most appropriate exercise for you.

Exercise increases your risk of hypoglycaemia. It is important to check your blood glucose levels more frequently when you exercise. This helps to prevent a hypo and to work out how your blood glucose levels change during and after exercise. You will likely need to adjust your insulin and eat more carbohydrate foods before or during exercise to help prevent a hypo. Remember exercise also includes gardening, long periods of intense housework or shopping. **What happens when I'm sick?**

It is important to understand the effects of illness on your diabetes and to know what you should do if you become unwell and/or are unable to eat food and fluids as normal.

When you are sick, it is important to check your blood glucose levels every 4 hours and to record them in your diary.

The first sign of a chest infection or illness may be that your blood sugars are higher than normal. This is quite normal and you may temporarily need more insulin or tablets. Continue your usual dose of insulin unless advised to change it by your Doctor.

If you are unable to eat as well as normal, your blood glucose levels may be lower than normal. If you are unable to eat solid food, it is important to take an alternative e.g. a drink or snack every two to three hours. Suitable alternatives are: *Lucozade*, milk, fruit juice, soft drink (not diet), ice cream, soup or a supplement drink. To prevent dehydration, it is also important to drink some fluids that do not contain carbohydrate e.g. water, sugar free drinks.



You should contact your Specialist CF Centre or present to hospital if you:

- Are vomiting
- Have diarrhoea
- Have poorly controlled blood glucose levels (too high or too low)

**Things I can do to help manage my CFRD:**

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For further information please contact your Dietitian or Cystic Fibrosis Centre