Continuous Glucose Monitoring (CGM)/Real-Time Flash Glucose Scanning (FGS) Training for Healthcare Professionals and Patients
## Contents - will be completed after feedback

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page no.</th>
<th>Chapter</th>
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</tr>
</thead>
</table>

### STEP 1
Introduction to CGM systems  
Difference between interstitial and capillary glucose  
Learn to identify trends and patterns

### STEP 2
Further understanding of trend arrows  
Learn to actively use target glucose range

### STEP 3
Recap the target glucose range  
Optimise the effect of CGM using trend arrows  
How to use the total dose adjustment tool  
How to use the insulin sensitivity fact tool (ISF)

### STEP 4
How to use the Ambulatory Glucose Profile (AGP)  
Diasend  
Ongoing follow up
Dexcom G5
Glucose Monitoring System

Patient leaflet

STEP 1
**Dexcom G5 - Introduction - Patient information**

**Getting started with your Dexcom G5**

- You must attend the first 4 training sessions to ensure you know how to use the Dexcom G5
- There are 4 leaflets to remind you of the 4 step training
- You will be asked to write down your reasons for using the CGM and what your targets are
- Further training will be arranged following completion of these first 4 steps
- As you get older the way you look after your diabetes will need changing
- Ongoing education is an essential part of your diabetes care to make sure you reach your targets

**Aims for STEP 1:**
- Getting started with CGM system - Dexcom 5
- Understanding the basic knowledge of your CGM system
- Learn to identify trends and patterns

**Aims for STEP 2:**
- Further understanding of trend arrows
- Learn to actively use target glucose range

**Aims for STEP 3:**
- Recap the target glucose range
- Optimise the effect of CGM using trend arrows
- How to use the total dose percentage adjustment tool
- How to use the insulin sensitivity factor tool (ISF))

**Aims for STEP 4:**
- How to use the Ambulatory Glucose Profile (AGP)
- Diasend
### Getting started with your Dexcom G5

What are your reasons for using the Dexcom G5?
Tick the statement/s below that you agree with.

<table>
<thead>
<tr>
<th>Suggestions for using the CGM</th>
<th>Tick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent hypos (low blood glucose levels)</td>
<td></td>
</tr>
<tr>
<td>Prevent high blood glucose levels</td>
<td></td>
</tr>
<tr>
<td>Manage blood glucose better when playing sport</td>
<td></td>
</tr>
<tr>
<td>Less blood testing from the fingers</td>
<td></td>
</tr>
<tr>
<td>Would like more information about blood glucose levels</td>
<td></td>
</tr>
</tbody>
</table>

**Any other reasons? Write below**

---

### Aims for using Dexcom G5

What are your aims for using the Dexcom G5?
Discuss these with your educator and make a note below:

<table>
<thead>
<tr>
<th>Aims for using the CGM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Remember!**

Look out for this symbol to remind you of the main messages in each step
Understanding the Dexcom G5 equipment

A. This is the sensor which measures the glucose level in the tissues. See page 9 for more details. It may be worn for 7 days before it needs replacing.

B. This is the transmitter which collects the messages from the sensor and sends it to the receiver and or smart device. It can be used for 3 months before it needs replacing (using the bluetooth feature to a smart phone uses more battery). The transmitter and receiver need to be within 6 metres of each other to see glucose level. It does not store glucose levels if out of range for any period of time.

C. The receiver accepts the glucose level results and displays the information over a set time period. It will also store glucose results ready to download. It needs charging every 3 days with a micro USB. To use the receiver is optional as you may use your smart device.

D. This is a smart device (Androind or iphone) so that you can view your glucose profile from the Dexcom G5 app.

E. Dexcom app symbol. This app needs to be downloaded to look at CGM data on a smart device. Up to 5 people may share this information.
Understanding the Dexcom G5 receiver screen

3 hour trend graph
The 3 hour trend graph will be displayed automatically but it may be changed to 1, 6, 12, 24 hour display.

Yellow and red lines
The yellow and red lines show your alert settings (to be discussed in step 2)
The receiver is programmed with an urgent low alarm set at 3.1 mmol/L. First warning is 4 vibrations followed by 4 beeps every 5 mins until you confirm it by pressing the select button.

Glucose target range
This is the area between your upper and lower target range. This will be set up in **STEP 2**

Battery life
The battery will last for approximately 6 months then it will need replacing

Blue tooth symbol
The blue tooth signal is displayed when the transmitter and receiver are connected

Current glucose level
This is the glucose level in the tissues over the past 5 mins
**Getting started with your Dexcom G5**

You will be shown how to apply your sensor and what the information on the meter screen means.

For the first 2 weeks you will be asked to simply watch the display to see how the reader records your glucose and the use of the arrows.

You must keep using your blood glucose meter until you attend the second training session (**STEP 2**). Keep a record of:

- Glucose level before and 2 hours after a meal
- Glucose during illness or stress
- The effect of physical activity on your glucose reading
- What your arrow trend is overnight
- The effect of meal insulin doses
- The timing of your meal time insulin in relation to the time of your meal or snack i.e. 5, 10, 15 mins before your meal
- What is the effect of your hypo treatment on your glucose. Do you under correct or over correct?

During your first 2 weeks you must also:

Download your data at least once a week into your home Diasend or Dexcom CLARITY and bring a print out to **STEP 2** training session.

Start to think about how you need to assess your glucose control.

**Check a blood glucose:**

- To confirm a low (less than 4.0 mmol/L) or high (14.0 mmol/L) sensor glucose reading.
- If Glucose levels are falling rapidly ↓↓ or rising rapidly ↑↑
- If CGM readings do not match your clinical symptoms

**Remember!**

Your sensor will need changing in 7 days

The transmitter needs charging every 3 days

Each new sensor will need calibrating twice a day

For 2 hours after calibration blood glucose tests are used for insulin dose adjustment (ONLY after completing **STEP 2**)

Record glucose levels from your CGM alongside your usual blood glucose

Do not alter insulin doses using your CGM until **STEP 2** is completed
Why is checking the glucose levels important?

Researchers in America have proven that keeping glucose levels in single figures most of the time reduces the chance, for some people, of getting problems with the eyes, kidneys, nerves and blood vessels.

This is why there are many different devices available to help children, young people and adults monitor their glucose levels.

However simply recording glucose levels is not enough. Any obvious patterns showing a need to change insulin treatment or revision of carbohydrate counting needs to be acted upon.

**Continuous education is essential**

There are 2 types of meter that read glucose levels but in a different way:

1. Blood glucose meter
2. Interstitial glucose meter or continuous glucose monitoring system (CGM)

What is the difference between blood glucose monitoring and interstitial glucose readings CGM?

- Blood glucose (BG) monitoring is taken using a finger pricker and meter. This gives the glucose value at the moment it is taken
- Interstitial glucose (CGM) monitoring. This measures the glucose between the tissues via an indwelling sensor
- There is a time delay between the true blood glucose level and the glucose level in the tissues using CGM
- This is called the lag time. (See page 10). It means the glucose level in the tissues will always be a few minutes behind the true glucose level
- There are different symbols called trend arrows on the CGM to help you to decide how to interpret the results this will be discussed in **STEP 2**

Remember!

Choosing to use the CGM means a new way of glucose monitoring

Trend arrows help in the decision making

Training is essential to interpret the increased number of glucose readings
The lag time is the difference in measurement between the actual blood sugar level and the interstitial glucose level. The time difference can vary between 6-12 mins.

- If your values are falling rapidly, your blood glucose value might initially be lower than the sensor reading (see diagram).
- If the values are rising rapidly, the blood glucose value might be higher than the sensor reading but then the sensor reading will go higher than your blood glucose value (see diagram below).

![Diagram showing differences between plasma and sensor glucose levels. Lag Time is about 5 minutes.]
What the trend arrows mean on your Dexcom G5

The trend arrow shows (circled in red):

- If the glucose is stable, rising or falling
- How fast this change is happening

<table>
<thead>
<tr>
<th>Arrow Trend</th>
<th>Description of trend arrow</th>
</tr>
</thead>
<tbody>
<tr>
<td>➡</td>
<td>Stable: Glucose is fairly stable. It may go up or down by 0.8 mmol/L in 15 mins</td>
</tr>
<tr>
<td>⬆</td>
<td>Slowly rising: Glucose is rising slowly. It may go up by 1.7 mmol/L in 15 mins</td>
</tr>
<tr>
<td>↑</td>
<td>Rising: Glucose is going up. It could go up by 2.5 mmol/L in 15 mins</td>
</tr>
<tr>
<td>➡️</td>
<td>Rising rapidly: Glucose is going up quickly. It may go up more than 2.5 mmol/L in 15 mins</td>
</tr>
<tr>
<td>⬇</td>
<td>Slowly falling: Glucose is going down slowly. It may go down by 1.7 mmol/L in 15 mins</td>
</tr>
<tr>
<td>➡️</td>
<td>Falling rapidly: Glucose is going down. It could fall by 2.5 mmol/L in 15 mins</td>
</tr>
<tr>
<td>⬇️</td>
<td>Falling very rapidly: Glucose is going down very quick. It could go down by more than 2.5 mmol/L</td>
</tr>
<tr>
<td>Blank</td>
<td>If no trend arrow appears: The receiver cannot work out if the glucose is going up or down and how fast</td>
</tr>
<tr>
<td>No arrow</td>
<td></td>
</tr>
</tbody>
</table>

What the trend graphs mean on your Dexcom G5

The trend graph is a time frame for you to look at your glucose levels in more detail.

It can be set at 1, 3, 6, 12 or 24 hour intervals.

You can switch between these times if you need to.

Over the next 2 weeks you will be asked to look at the different trend graphs and work out which one you prefer.

Think about why you want to use the CGM and which method of looking at your glucose levels is better for you.

But do not use the glucose results for altering your insulin dose until you have completed STEP 2 and 3.
Dexcom G5 Trend graphs - **STEP 1** - Patient information

### 3 hour trend
This appears when the receiver is turned on
- Good to use for:
  - Meal times and after
  - During exercise
  - A daily trend

### 1 hour trend
Good to use for:
- Times when you have made changes to insulin or treated a hypo
- Showing a change in glucose direction quicker than the trend arrows

### 6 hour trend
Good to use for:
- Checking your basal or background insulin dose
- Checking the effect of insulin on meals containing large amounts of fat
- Checking effects of exercise

### 12 hour trend
Good to use for:
- Checking overnight glucose levels
- Looking at the glucose level during the night

### 24 hour trend
Good to use for:
- Looking at the whole day
- Checking for any highs or lows during the day
- Comparing with other days to see for patterns when glucose is out of target range

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**Remember!**

The trend graphs can help you pick out any times your glucose level is out of range.

They can give you a quicker idea about how quickly the glucose is changing.
General information

- Sensor needs to be changed every 7 days
- Change position of sensor to prevent problems with the sensor site
- Sensor worn around the abdomen but 8cm away from pump or injection site or outer part of the buttocks
- The transmitter may be used for up to 3 months
- Calibration is needed for every sensor change and every 12 hours to ensure accuracy
- The first reading may be taken 2 hours after changing the sensor
- Do not use any alerts for the first 2 weeks (to be discussed further in STEP 2)
- Download App onto smart device to view readings
- Make sure smart device is turned on
- You may set an alert for a low glucose for first 2 weeks
- Keep smart device charged to receive information
- Sensor ONLY is water resistant up to 2.4 metres for up to 24 hours

- Check the adhesive patch is firmly in place before going in water. More plaster may be added but not over the sensor
- Review data by downloading once a week
- To get the benefit from CGM, **You must wear it at least 70% of the time**
- You must check a blood glucose to confirm a low or high sensor glucose reading
- Extra information on insulin dose, exercise, food intake may be set in Notes on the CGM

**WARNING!**
Paracetamol seriously affects the glucose readings for up to 6 hours after last dose. Do not use Dexcom readings when taking paracetamol

**Remember!**
- It must be worn at least 70% of the time
- Download data once a week to review glucose control
- Paracetamol affects glucose readings
**What to practise for next session - STEP 2**

For the first 2 weeks watch the display to see how the CGM reader records your glucose and observe the direction of trend arrows and use the trend graphs.

**You** must keep using your blood glucose meter until you attend the second training session *(STEP 2)*. Keep a record of:

- Glucose level before and 2 hours after a meal
- Glucose during illness or stress
- The effect of physical activity on your glucose reading
- What your trend arrow is doing overnight
- The effect of meal insulin doses on your glucose level
- Note what time you take your insulin and what time you eat your meal or snack

**You must also:**

- Read the receiver within 10 mins if the trend arrow is pointing straight up or down
- Download your data at least once a week and bring to the **STEP 2** training session
- Think about how you will use the CGM glucose readings
- Check a **blood glucose** to confirm a low (4.0 mmol/L) or high (14.0 mmol/L) sensor glucose reading or if glucose levels are falling ↓↓ rapidly or rising ↑↑ rapidly

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**Date for STEP 2 training:**

____________________________________________________

**Diabetes team contact details:**

____________________________________________________

**Notes:**

____________________________________________________

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**Remember!**

**Do not** use your Dexcom for changes to your insulin doses **until** you have completed **STEP 2**

At your next session your blood glucose results and CGM results will be discussed

After **STEP 2** training you will start to use your CGM readings for treatment changes

**PARACETAMOL** affects the sensor so will give false glucose readings
Dexcom G5
Glucose Monitoring System

Patient leaflet

STEP 2
Dexcom G5 - Introduction - Patient information

Getting started with your Dexcom G5

Aims for STEP 1:
• Getting started with CGM system - Dexcom 5
• Understanding the basic knowledge of your CGM system
• Learn to identify trends and patterns

Aims for STEP 2:
• Further understanding of trend arrows
• Learn to actively use target glucose range

Aims for STEP 3:
• Recap the target glucose range
• Optimise the effect of CGM using trend arrows
• How to use the total dose percentage adjustment tool
• How to use the insulin sensitivity factor tool (ISF))

Aims for STEP 4:
• Using AGP profile and trend data
• Diasend

You must attend the first 4 training sessions to ensure you know how to use the Dexcom G5
There are 4 leaflets to remind you of the 4 step training
You will be asked to write down your reasons for using the CGM and what your targets are
Further training will be arranged following completion of these first 4 steps
As you get older the way you look after your diabetes will need changing
Ongoing education is an essential part of your diabetes care to make sure you reach your targets

Ongoing education is an essential part of your diabetes care to make sure you reach your targets
**Setting alerts for high and low glucose readings**

Your glucose target range is set to make sure you know what the best glucose level to aim for is.

The alerts are your warning signs that your glucose control is not within this ideal target range.

It may take time to achieve glucose levels within your target range most of the time but the alerts can be set so that you gradually improve your glucose levels without having too many high or low events.

Regularly checking your receiver means you are not relying on the alerts to manage your glucose levels. This means you can set your alerts higher or lower.

**Reasons for using the CGM:**

1. **Prevent high glucose levels**

   If your goal is to prevent a high glucose but are unsure of the CGM then start by setting the high alert higher than you would want to.

   To decide how high look at your blood glucose results over the past 2 weeks and work out with your diabetes educator an upper alert.

   Once you have used this for couple of weeks and you start to use the CGM alerts to make decisions on your diabetes management slowly start to reduce the upper alert.

2. **Prevent low glucose levels**

   If your reason for using the CGM is to prevent hypos or you are not sure of your hypo signs and symptoms then try setting the low alert higher than 4 mmol/L. I.e. 5.5 mmol/L.

   This way you will be aware your glucose is falling and prevent a hypo from happening.

   **Remember!**

   If worried about hypos during the night you can start by setting your low alert at 5 mmol/L

   The alerts and trend arrows (how fast your glucose is falling) will give you the information you need to pick up on any patterns about when you go low and hopefully help you to start to recognise your signs and symptoms.

3. **Urgent low alarm cannot be changed or switched off**

   There is an alarm that will sound when the sensor reading is 3.1 mmol/L or lower. It will protect you from very low glucose levels.

   **Remember!**

   The glucose level in your blood falls before the glucose in your tissues so blood glucose could be lower than Dexcom reading.
**HbA1c and setting alerts**

- The HbA1c is taken in clinic every 3 months
- The result is the average blood glucose level over 10-12 weeks
- The CGM readings give an average glucose reading continually
- This can be used to help set alerts to warn when glucose levels are travelling too low or too high

**HbA1c target**

The target for the HbA1c is 48 mmol/mol or 6.5%.

Look at the chart below to help you to work out how to achieve this goal by setting alerts on the CGM.

<table>
<thead>
<tr>
<th>Estimated average glucose</th>
<th>3.8 mmol/L</th>
<th>7.7 mmol/L</th>
<th>9.3 mmol/L</th>
<th>11.7 mmol/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too low risk of hyp</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ideal target range</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good control but not in target</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glucose and HbA1c too high</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glucose extremely</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HbA1c</th>
<th>20 mmol/L</th>
<th>48 mmol/L</th>
<th>58 mmol/L</th>
<th>75 mmol/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0%</td>
<td>6.5%</td>
<td>7.5%</td>
<td>9.0%</td>
<td></td>
</tr>
</tbody>
</table>

**Estimated average glucose over 2 weeks**

<table>
<thead>
<tr>
<th>Suggested high alert level setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 8.0 mmol/L</td>
</tr>
<tr>
<td>11.0 mmol/L</td>
</tr>
<tr>
<td>8.1 - 10.0 mmol/L</td>
</tr>
<tr>
<td>11.0 mmol/L</td>
</tr>
<tr>
<td>10.1- 12 mmol/L</td>
</tr>
<tr>
<td>14.0 mmol/L</td>
</tr>
<tr>
<td>&gt; 12 mmol/L</td>
</tr>
<tr>
<td>14.0 mmol/L</td>
</tr>
</tbody>
</table>

**Write down your HbA1c:**

**Current:** ____________________________

**Target:** ____________________________

**Remember!**

- If you are choosing to use the CGM to improve your glucose control use the first few weeks to get used to the extra information the CGM gives you
- Set realistic alert settings based on your current glucose levels and gradually aim for the target level
- The CGM does not replace blood glucose monitoring it is offering you extra information to base your insulin dose adjustment on
- These are only suggested levels you will need to work with your educator to find out the level which suits you
Look at your glucose profiles you have recorded over the last 2 weeks. Discuss with your educator what your glucose alerts should be set at.

💡 Think about:
1. How often were your low?
2. Is there a pattern to the time and day?
3. Did you count your carbohydrate correctly?
4. Were you unwell?
5. What time had you taken your insulin?
6. Had you had a correction dose with your meal?
7. Did you do any exercise planned or unplanned that may have caused the low glucose?

Setting glucose alerts

Look back at your aims for using the Dexcom G5. Discuss these with your educator and make any new notes below:

_____________________________________________________
_____________________________________________________
_____________________________________________________
Setting higher glucose alerts

Look at your the higher glucose results on the CGM and compare with your blood glucose levels taken at the same time and any changes you made to your insulin dose.

<table>
<thead>
<tr>
<th>TIME:</th>
<th>TIME:</th>
<th>TIME:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discuss the difference between the readings and any action you took.

💡 Think about:
1. How often were you out of target range?
2. Is there a pattern to the time and day?
3. Did you count your carbohydrate correctly?
4. Were you unwell?
5. What time had you last taken your insulin?
6. Did you need a correction dose?
7. Did the correction dose bring you back down into your target range?

What is your higher glucose alert?

Write down how you will respond to a high glucose level

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
**Using trend arrows to set advanced alerts for rising or falling glucose levels**

Advanced alerts may be set when the glucose is falling or rising rapidly. When setting these alerts in the ALERT/ADVANCED menu choose the 0.11 mmol/L/minute setting.

**Using trend arrows to set alerts for RAPIDLY rising or falling glucose levels**

For the double arrowed rapidly rising or falling arrows the extra alert may be set in ALERT/ADVANCED menu by choosing the 0.17 mmol/L/minute setting.

**Extra alert option**

An advanced alert to avoid prolonged high or low glucose may be set.

This is set using the repeat function and you can choose to receive a reminder for up to 300 minutes after your first alert.

The repeat function reminds you to check and see if any further action is needed. BUT do not set it too close to the first alert.

This prevents you giving insulin too close if your glucose was high.

**Remember!**

Alerts are used to help you to manage your glucose levels not to be annoying.

Do not turn off your alerts. they are there to help you.

Do not set the repeat alert less than 120 mins to prevent giving insulin too close together.
### Alert vibrations and sounds

<table>
<thead>
<tr>
<th>Vibration</th>
<th>Low</th>
<th>Normal</th>
<th>Hyporepeat</th>
<th>Clear</th>
</tr>
</thead>
<tbody>
<tr>
<td>High glucose alert</td>
<td>2 long vibrations</td>
<td>+2 low beeps</td>
<td>+2 medium beeps</td>
<td>+ asc. melody</td>
</tr>
<tr>
<td>Low glucose alert</td>
<td>3 short vibrations</td>
<td>+3 low beeps</td>
<td>+3 medium beeps</td>
<td>+ desc. melody</td>
</tr>
<tr>
<td>Urgent low alarm</td>
<td>4 short vibrations</td>
<td>+4 medium beeps</td>
<td>+4 medium beeps **</td>
<td>+ 2 long descending melodies + pause + 4 low beeps</td>
</tr>
</tbody>
</table>

** Pre-set safety alarm to prevent severe hypos. If selected it is repeated every 5 mins

**Remember!**

Learning the different sound the alerts enables you to recognise important messages when unable to look at the receiver i.e. 4 vibration/beeps means take immediate action.
**What to practise for next session - STEP 3**

Look at the settings in your Dexcom G5 and choose the alarms to use.

Don’t try and set too many alerts at the beginning

Think about:

- Are the alerts setting right for you?
- Do they give you time to prevent a hypo?
- Look at the trend arrows alongside the glucose level. Before making a change.

Think about:

- When did you last take insulin?
- When did you last take a meal or drink containing carbohydrate?
- When did you last do any exercise or are you about to do some?
- Are there any other factors affecting your glucose levels i.e. exams, illness, stress
- Is a blood glucose reading needed?
- Do you have any symptoms that don’t reflect your glucose

**Date for STEP 3 training:**

__________________________

**Notes:**

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**WARNING!**
Paracetamol seriously affects the glucose readings for up to 6 hours after last dose.
Do not use Dexcom readings when taking paracetamol
Dexcom G5
Glucose Monitoring System
Patient leaflet

STEP 3
Dexcom G5 - Introduction - Patient information

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**Aims for STEP 2:**
- Further understanding of trend arrows
- Learn to actively use target glucose range

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- Recap the target glucose range
- Optimise the effect of CGM using trend arrows
- How to use the total dose percentage adjustment tool
- How to use the insulin sensitivity factor tool (ISF)

**Aims for STEP 4:**
- How to use the Ambulatory Glucose Profile (AGP)
- Diasend
**Recap on setting target glucose range**

Do you have any new aims for using the? Discuss these with your educator and make a note below:

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

Look at your glucose profiles you have recorded since your last session.

Discuss with your educator if your glucose target range is set correctly.

What is your lower target level set at now? ____________________________

What is your upper level set at now? ____________________________

---

**Recap on trend arrows and what they mean?**

Trend arrows on the CGM give you an idea as to how fast or slow your glucose is rising or falling.

Don’t forget the blood glucose level will be lower than the CGM result. If arrows straight up or down check blood glucose.

<table>
<thead>
<tr>
<th>Arrow Trend</th>
<th>Description of trend arrow</th>
</tr>
</thead>
<tbody>
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<td>➡️</td>
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<tr>
<td>⬆️</td>
<td>Rising: It could go up by 2.5 mmol/L in 15 mins</td>
</tr>
<tr>
<td>⬆️⬆️</td>
<td>Rising rapidly: It may go up more than 2.5 mmol/L in 15 mins</td>
</tr>
<tr>
<td>⬇️</td>
<td>Slowly falling: It may go down by 1.7 mmol/L in 15 mins</td>
</tr>
<tr>
<td>⬇️⬇️</td>
<td>Falling rapidly: It could fall by 2.5 mmol/L in 15 mins</td>
</tr>
<tr>
<td>⬇️⬇️⬇️</td>
<td>Falling very rapidly: It may go down by more than 2.5 mmol/L</td>
</tr>
</tbody>
</table>

If no trend arrow appears: The receiver cannot work out if the glucose is going up or down and how fast.
Insulin adjustment tools?

There are 2 methods for adjusting insulin which use the trend arrows to help you to make decisions to your insulin dose.

Each method gives a different insulin dose adjustment, Your educator will discuss the best method for you.

There are 2 occasions when the arrows may be used:

1. At meal times
2. In between meals and snacks (when you are NOT eating a meal)

The 2 methods you can use are:

Method 1 (page 28)
Total insulin dose percentage adjustment tool

Method 2 (page 32)
Insulin sensitivity factor tool (ISF)

This how much 1 unit of insulin drops the blood glucose by i.e. 1:3 means 1 unit of quick acting insulin brings the blood glucose down by 3 mmol/l

Write down your ISF ____________________

Method 1

A) With meals

Work out the carbohydrate value of your meal
Look at the trend arrow and work out whether you need to increase or decrease the total insulin dose by 10-30% BUT if a correction dose is needed the increase or decrease of insulin (depending on the direction of the arrow will be worked out with the correction dose.

NOTE: If using the bolus advisor handset you will have to work out the 10-30% dose and add it on yourself because the handset will not do it for you

Method 2

B) In between meals or snacks

If extra insulin is needed in between meals (at least 2 hours after last insulin dose) the adjustment tool will be worked out on your usual correction dose ration i.e. increase correction dose by 10-30% and recheck in 2 hours and repeat if needed.

NOTE: This may coincide with meal time

These tools are only a guide. There may be other things that you need to think about before making the correct decision about your insulin dose for example:

• Are you unwell?
• When did you last exercise?
• Are you doing exams so feeling worried or stressed?
• When did you last take an insulin dose?
### Method 1 - Total insulin dose percentage adjustment

This table helps you to decide how much insulin to give by using the glucose level and the direction of the trend arrow before a meal and when a blood glucose must also be taken before deciding on your dose.

<table>
<thead>
<tr>
<th>Arrow Trend</th>
<th>Description of trend arrow</th>
<th>Action needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>➔</td>
<td>Stable: It may go up or down by 0.8 mmol/L in 15 mins</td>
<td>Give dose as calculated</td>
</tr>
<tr>
<td>↑</td>
<td>Slowly rising: It may go up by 1.7 mmol/L in 15 mins</td>
<td>Add 10% extra to calculated dose</td>
</tr>
<tr>
<td>↑</td>
<td>Rising: It could go up by 2.5 mmol/L in 15 mins</td>
<td>Add 20% extra to calculated dose</td>
</tr>
<tr>
<td>↑↑</td>
<td>Rising rapidly: It may go up more than 2.5 mmol/L in 15 mins</td>
<td>Add 30% extra to calculated dose</td>
</tr>
<tr>
<td>↓</td>
<td>Slowly falling: It may go down by 1.7 mmol/L in 15 mins</td>
<td>Take away 10% from calculated dose</td>
</tr>
<tr>
<td>↓↓</td>
<td>Falling rapidly: It could fall by 2.5 mmol/L in 15 mins</td>
<td>Take away 20% from calculated dose</td>
</tr>
<tr>
<td>Blank No arrow</td>
<td>Falling very rapidly: It may go down by more than 2.5 mmol/L</td>
<td>Take away 30% from calculated dose</td>
</tr>
</tbody>
</table>

**How to work out 10% of your meal time dose:**

10% of meal time insulin = meal time insulin ÷ 10

This amount will either be added to your meal time dose or taken off your meal time dose

**How to work out 20% of your meal time dose:**

20% of meal time insulin = meal time insulin ÷ 5

This amount will either be added to your meal time dose or taken off your meal time dose

**How to work out 30% of your meal time dose:**

30% of meal time insulin = meal time insulin ÷ 100 x 30

This amount will either be added to your meal time dose or taken off your meal time dose
## Total insulin dose percentage adjustment example 1

1. Count how much carbohydrate you are going to eat
2. Write down your meal time dose
3. What is your glucose level?
4. Do you need a correction dose? (example below uses 1:3)
5. Write down your meal time dose + correction dose if needed.
6. Look at the direction of the arrows on your meter and find the arrow below. Use this line to work out what insulin to have.
7. Do you need to increase total insulin or decrease your total insulin dose?
8. Insulin dose to be given?
9. Glucose reading after 2 hours should be no more the 2 mmol/L higher than pre meal value (if within target glucose range).

### Table: Total insulin dose percentage adjustment example 1

<table>
<thead>
<tr>
<th>Meal carbs</th>
<th>Meal insulin units (ratio 1:10)</th>
<th>Glucose reading before food</th>
<th>Correction dose (if needed)</th>
<th>Meal time dose + correction dose units</th>
<th>Which trend arrow do you have?</th>
<th>Insulin dose increased or decreased by 10% 20% or 30%</th>
<th>Insulin dose to be given</th>
<th>Glucose reading after 2 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10</td>
<td>6.0 mmol/L</td>
<td>none</td>
<td>10 + 0</td>
<td>➤</td>
<td>Give dose as calculated</td>
<td>10 + 0 = 10 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>6.0 mmol/L</td>
<td>none</td>
<td>10 + 0</td>
<td>⬆</td>
<td>10% increase 10 ÷ 10 = 1 unit</td>
<td>10 + 1 = 11 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>6.0 mmol/L</td>
<td>none</td>
<td>10 + 0</td>
<td>↑</td>
<td>20% increase 10 ÷ 5 = 2 units</td>
<td>10 + 2 = 12 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>6.0 mmol/L</td>
<td>none</td>
<td>10 + 0</td>
<td>⬆</td>
<td>30% increase 10 ÷ 100 x 30 = 3 units</td>
<td>10 + 3 = 13 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>6.0 mmol/L</td>
<td>none</td>
<td>10 + 0</td>
<td>⬇</td>
<td>10% decrease 10 ÷ 10 = 1 unit</td>
<td>10 - 1 = 9 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>6.0 mmol/L</td>
<td>none</td>
<td>10 + 0</td>
<td>↓</td>
<td>20% decrease 10 ÷ 5 = 2 units</td>
<td>10 - 2 = 8 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>6.0 mmol/L</td>
<td>none</td>
<td>10 + 0</td>
<td>↓</td>
<td>30% decrease 10 ÷ 100 x 30 = 3 units</td>
<td>10 - 3 = 7 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
</tbody>
</table>
**Total insulin dose percentage adjustment - example 2**

1. Count how much carbohydrate you are going to eat
2. Write down your meal time dose
3. What is your glucose level?
4. Do you need a correction dose? (example below uses 1:3)
5. Write down your meal time dose + correction dose if needed.
6. Look at the direction of the arrows on your meter and find the arrow below. Use this line to work out what insulin to have.
7. Do you need to increase total insulin or decrease your total insulin dose?
8. Insulin dose to be given?
9. Glucose reading after 2 hours should be no more the 2 mmol/L higher than pre meal value (if within target glucose range).

<table>
<thead>
<tr>
<th>Meal carbs</th>
<th>Meal insulin units (ratio 1:10)</th>
<th>Glucose reading before food</th>
<th>Correction dose (if needed)</th>
<th>Meal time dose + correction dose units</th>
<th>Which trend arrow do you have?</th>
<th>Insulin dose increased or decreased by 10% 20% or 30%</th>
<th>Insulin dose to be given</th>
<th>Glucose reading after 2 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10</td>
<td>14.0 mmol/L</td>
<td>3 units</td>
<td>10 + 3</td>
<td>➔</td>
<td>Give dose as calculated</td>
<td>13 + 0 = 13 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>14.0 mmol/L</td>
<td>3 units</td>
<td>10 + 3</td>
<td>➔</td>
<td>10% increase 13 + 10 = 1.3 unit</td>
<td>13 + 1.3 = 14.3 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>14.0 mmol/L</td>
<td>3 units</td>
<td>10 + 3</td>
<td>➔</td>
<td>20% increase 13 + 5 = 2.6 units</td>
<td>13 + 2.6 = 15.6 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>14.0 mmol/L</td>
<td>3 units</td>
<td>10 + 3</td>
<td>➔</td>
<td>30% increase 13 + 100 x30 = 3.9 unit</td>
<td>13 + 3.9 = 16.9 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>14.0 mmol/L</td>
<td>3 units</td>
<td>10 + 3</td>
<td>➔</td>
<td>10% decrease 13 + 10 = 1.3 units</td>
<td>13 - 1.3 = 11.7 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>14.0 mmol/L</td>
<td>3 units</td>
<td>10 + 3</td>
<td>➔</td>
<td>20% decrease 13 + 5 = 2.6 units</td>
<td>13 - 2.6 = 10.4 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>14.0 mmol/L</td>
<td>3 units</td>
<td>10 + 3</td>
<td>➔</td>
<td>30% decrease 13 + 100 x30 = 3.9 unit</td>
<td>13 - 3.9 = 9.1 units</td>
<td>6.0 - 8.0 mmol/L</td>
</tr>
</tbody>
</table>
Practise how to work out insulin dose with trend arrows

1. Use a typical meal example. Use your glucose reading on your CGM to practise using the percentage adjustment tool.
2. Work out your insulin dose.
3. Use your glucose reading on your CGM to practise using the percentage adjustment tool.
4. Is a correction dose needed?
5. Add meal insulin and any correction dose together
6. Look at trend arrow graph. Do you need to increase or decrease your insulin dose by 10%, 20% or 30%?

### Before giving your insulin dose THINK are there any other reasons to make further changes to your bolus dose?

<table>
<thead>
<tr>
<th>1 Meal Carbs</th>
<th>2 Meal time insulin units</th>
<th>3 Glucose reading before food</th>
<th>4 Correction dose if needed</th>
<th>5 Total insulin dose (+ correction dose) units</th>
<th>6 Which trend arrow do you have?</th>
<th>7 Insulin dose increased or decreased by 10%, 20% or 30%</th>
<th>8 Insulin dose to be given</th>
<th>9 Glucose reading after 2 hours</th>
</tr>
</thead>
<tbody>
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</table>
**Method 2 - Insulin sensitivity factor tool (ISF)**

The Insulin sensitivity factor tool helps you decide how much insulin to add or take away from your total insulin dose without having to work it out.

<table>
<thead>
<tr>
<th>Insulin sensitivity factor</th>
<th>Direction of trend arrows</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The glucose is rising steadily, <strong>ADD</strong> the amount of units below to the total bolus amount</td>
</tr>
<tr>
<td></td>
<td>The glucose is rising moderately, <strong>ADD</strong> the amount of units below to the total bolus amount</td>
</tr>
<tr>
<td></td>
<td>The glucose is rising rapidly, <strong>ADD</strong> the amount of units below to the total bolus amount</td>
</tr>
<tr>
<td></td>
<td>The glucose is falling steadily, <strong>TAKE OFF</strong> the amount of units below from the total bolus amount</td>
</tr>
<tr>
<td></td>
<td>The glucose is falling moderately <strong>TAKE OFF</strong> the amount of units below to the total bolus amount</td>
</tr>
<tr>
<td></td>
<td>The glucose is falling rapidly <strong>TAKE OFF</strong> the amount of units below to the total bolus amount</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insulin sensitivity factor</th>
<th>1.0</th>
<th>1.5</th>
<th>2.0</th>
<th>2.5</th>
<th>3.0</th>
<th>3.5 - 4.0</th>
<th>4.5 - 5.0</th>
<th>5.5 - 6.0</th>
<th>7.0 - 8.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
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<td>1.5</td>
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<td>2.0</td>
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<td>2.5</td>
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<td>3.0</td>
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<tr>
<td>3.5 - 4.0</td>
<td>0.4</td>
<td>0.8</td>
<td>0.6</td>
<td>0.6</td>
<td>0.5</td>
<td>0.75</td>
<td>0.9</td>
<td>0.75</td>
<td>0.6</td>
</tr>
<tr>
<td>4.5 - 5.0</td>
<td>0.4</td>
<td>0.8</td>
<td>0.6</td>
<td>0.6</td>
<td>0.5</td>
<td>0.75</td>
<td>0.9</td>
<td>0.75</td>
<td>0.6</td>
</tr>
<tr>
<td>5.5 - 6.0</td>
<td>0.4</td>
<td>0.8</td>
<td>0.6</td>
<td>0.6</td>
<td>0.5</td>
<td>0.75</td>
<td>0.9</td>
<td>0.75</td>
<td>0.6</td>
</tr>
<tr>
<td>7.0 - 8.0</td>
<td>0.2</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Before giving your insulin dose **THINK** are there any other reasons to make further changes to your bolus dose?
**Insulin sensitivity factor tool (ISF)**

Now fill in this chart with your educator to practice using the ISF tool page 32 using your own readings as examples.

1. Count how much carbohydrate you are going to eat
2. Write down your meal time dose
3. What is your glucose level?
4. Do you need a correction dose?
5. Write down your meal time dose + correction dose if needed.
6. Look at the direction of the arrows on your meter and find the arrow below. Use this line to work out what insulin to have.

7. Look at the ISF dose to be added or taken away from the total dose
8. Insulin dose to be given?
9. Glucose reading after 2 hours should be no more the 2 mmol/L higher than pre meal value (if within target glucose range).

<table>
<thead>
<tr>
<th>1 Meal Carbs</th>
<th>2 Meal time insulin units</th>
<th>3 Glucose reading before food</th>
<th>4 Correction dose if needed</th>
<th>5 Total insulin dose (+ correction dose) units</th>
<th>6 Which trend arrow do you have?</th>
<th>7 Look at ISF and write down +/- insulin dose</th>
<th>8 Insulin dose to be given</th>
<th>9 Glucose reading after 2 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
### Correction dose adjustment using the trend arrows

Example based on glucose of 12.0 mmol/L

<table>
<thead>
<tr>
<th>Trend arrow</th>
<th>Maximum change in 15 mins</th>
<th>Glucose in 15 mins</th>
<th>Action needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>➞</td>
<td>Glucose is changing up or down (maximum 0.8 mmol/L per min)</td>
<td>Stable 11.2 or 12.8 mmol/L</td>
<td>Give usual correction dose</td>
</tr>
<tr>
<td>➥</td>
<td>Falls by maximum of 1.7 mmol/L in 15 mins</td>
<td>10.3 mmol/L</td>
<td>Give usual correction dose</td>
</tr>
<tr>
<td>↓</td>
<td>Falls rapidly maximum of 2.5 mmol/L</td>
<td>9.5 mmol/L</td>
<td>Wait until levelled off and glucose is stable</td>
</tr>
<tr>
<td>↔</td>
<td>Falling very rapidly by more than 2.5 mmol/L</td>
<td>&lt;9.5 mmol/L</td>
<td>Wait until levelled off and glucose is stable</td>
</tr>
<tr>
<td>↑</td>
<td>Glucose is rising by maximum of 1.7 mmol/L</td>
<td>13.7 mmol/L</td>
<td>Add 10% to correction dose</td>
</tr>
<tr>
<td>↑</td>
<td>Rising rapidly by maximum of 2.5 mmol/L</td>
<td>14.5 mmol/L</td>
<td>Add 20% to correction dose</td>
</tr>
<tr>
<td>↑↑</td>
<td>Rising very rapidly by more than 2.5 mmol/L</td>
<td>&gt;14.5 mmol/L</td>
<td>Add 25-30% to correction dose</td>
</tr>
</tbody>
</table>

**Write down your correction dose ratio:**

You may need to make a different decision if glucose not too high

<table>
<thead>
<tr>
<th>Trend arrow</th>
<th>Glucose in 15 mins</th>
<th>Action needed</th>
<th>Correction dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>➞</td>
<td></td>
<td>Give usual correction dose</td>
<td></td>
</tr>
<tr>
<td>➥</td>
<td></td>
<td>Give usual correction dose</td>
<td></td>
</tr>
<tr>
<td>↓</td>
<td></td>
<td>Think do you need to wait until levelled off and glucose is stable</td>
<td></td>
</tr>
<tr>
<td>↔</td>
<td></td>
<td>Think do you need to wait until levelled off and glucose is stable</td>
<td></td>
</tr>
<tr>
<td>↑</td>
<td>Add 10% to correction dose</td>
<td>Add 10% to correction dose</td>
<td></td>
</tr>
<tr>
<td>↑</td>
<td>Add 20% to correction dose</td>
<td>Add 20% to correction dose</td>
<td></td>
</tr>
<tr>
<td>↑↑</td>
<td>Add 25-30% to correction dose</td>
<td>Add 25-30% to correction dose</td>
<td></td>
</tr>
</tbody>
</table>
Using trend arrows to prevent or act on a low glucose level

- The trend arrows can help during exercise or any other time of increased activity.
- Look at the direction of the arrow along with your glucose level.
- Remember how quickly and by how much the glucose level can fall by in 15 mins.
- By acting early you may prevent a hypo.
- You may have to experiment to know at what point you need to take extra fast acting carbohydrate during exercise.
- Start by acting at a higher level than you would normally do until you have evidence as to the point at which you need to act.

💡 Remember!

Temperature, type of activity, duration, all have a different effect on glucose levels so you may have a different plan for each activity

<table>
<thead>
<tr>
<th>Trend arrow</th>
<th>Maximum change in 15 mins</th>
<th>Prevent or act on current glucose level of:</th>
</tr>
</thead>
</table>
| ➡           | Glucose is stable only changing up or down (maximum 0.8 mmol/L per min) | 4.8 mmol/L or lower  
If active eat some carbohydrate to prevent hypo.  
If sitting still or about to eat try waiting and check the trend. |
| ➣           | Falls by maximum of 1.7 mmol/L in 15 mins   | 5.7 mmol/L or lower  
If active think about how long it will be before next meal/snack |
| ⤴           | Falls rapidly maximum of 2.5 mmol/L        | 6.5 mmol/L or lower  
If very active you may need to eat fast acting carbohydrate even if higher than 6.5 mmol/L |
| ⤴ ⤴         | Falling very rapidly by more than 2.5 mmol/L | 6.5 mmol/L higher or lower  
If very active you will need to eat fast acting carbohydrate to prevent a hypo |

Suggested action depending on glucose level:

Find out what works for you ...... gradually

Notes:
Dexcom G5 - **STEP 3** - Patient information

**What to practise for next session - STEP 4**

Trend arrows, with your glucose level, are to be used in helping you to decide:

- On insulin dose adjustment
- Whether or when to take carbohydrate to prevent a hypo

Over next few weeks look at the trend arrows and use the charts to help you to make the changes to your insulin dose or treat hyper or hypo glycaemia.

Start very cautiously and build up your experience to prevent unnecessary high or low glucose levels.

**Date for next CGM review:**

______________________________

______________________________

**Remember!**

- Choosing to use the CGM means a new way of glucose monitoring
- CGM does not replace blood glucose monitoring
- Training is essential to interpret the increased number of glucose readings
- Trend arrows help to give you extra information about which direction your glucose is travelling in and how fast
- Insulin dose adjustment tools can help you decide how much total insulin to give
- The CGM has alerts to help you act on your glucose level. These MUST NOT be turned off
- **DO NOT** use CGM if taking Paracetamol. Wait at least 6 hours after last dose before reading the CGM
- Is trend arrow ↑↑ or ↓↓ **YES** Check blood glucose

**Notes:**

_____________________________________________________

_____________________________________________________
Dexcom G5
Glucose Monitoring System

Patient leaflet

**STEP 4**
Getting started with your Dexcom G5

Aims for STEP 1:
- Getting started with CGM system - Dexcom 5
- Understanding the basic knowledge of your CGM system
- Learn to identify trends and patterns

Aims for STEP 2:
- Further understanding of trend arrows
- Learn to actively use target glucose range

Aims for STEP 3:
- Recap the target glucose range
- Optimise the effect of CGM using trend arrows
- How to use the total dose percentage adjustment tool
- How to use the insulin sensitivity factor tool (ISF)

Aims for STEP 4:
- Recap the target glucose range
- Using AGP profile and trend data
- Diasend

You must attend the first 4 training sessions to ensure you know how to use the Dexcom G5
There are 4 leaflets to remind you of the 4 step training
You will be asked to write down your reasons for using the CGM and what your targets are
Further training will be arranged following completion of these first 4 steps
As you get older the way you look after your diabetes will need changing
Ongoing education is an essential part of your diabetes care to make sure you reach your targets
Recap on setting target glucose range

Do you have any new aims for using the Dexcom G5? Discuss these with your educator and make a note below:

________________________________________________________________________________________________________

________________________________________________________________________________________________________

________________________________________________________________________________________________________

________________________________________________________________________________________________________

Look at your glucose profiles you have recorded since your last session.

Discuss with your educator if your glucose target range is set correctly.

What is your lower target level set at now?  
What is your upper level set at now?  

Recap on trend arrows and what they mean?

Trend arrows on the CGM give you an idea as to how fast or slow your glucose is rising or falling.

Don’t forget the blood glucose level will be lower than the CGM result. If arrows straight up or down check blood glucose.

<table>
<thead>
<tr>
<th>Arrow Trend</th>
<th>Description of trend arrow</th>
</tr>
</thead>
<tbody>
<tr>
<td>➤</td>
<td>Stable: It may go up or down by 0.8 mmol/L in 15 mins</td>
</tr>
<tr>
<td>➤</td>
<td>Slowly rising: It may go up by 1.7 mmol/L in 15 mins</td>
</tr>
<tr>
<td>↑</td>
<td>Rising: It could go up by 2.5 mmol/L in 15 mins</td>
</tr>
<tr>
<td>↑↑</td>
<td>Rising rapidly: It may go up more than 2.5 mmol/L in 15 mins</td>
</tr>
<tr>
<td>↓</td>
<td>Slowly falling: It may go down by 1.7 mmol/L in 15 mins</td>
</tr>
<tr>
<td>↓↓</td>
<td>Falling rapidly: It could fall by 2.5 mmol/L in 15 mins</td>
</tr>
<tr>
<td>↓↓↓</td>
<td>Falling very rapidly: It may go down by more than 2.5 mmol/L</td>
</tr>
<tr>
<td>No arrow</td>
<td>If no trend arrow appears: The receiver cannot work out if the glucose is going up or down and how fast</td>
</tr>
</tbody>
</table>
Introduction to ambulatory glucose profile (AGP)

Your CGM device and the software with it (Dexcom Clarity) and or the Diasend software (if used in your clinic) will give you lots of information which may be confusing. This session is to help you to understand the different graphs and how to use them to improve your glucose control, focusing on the Diasend graphs.

1. Daily trend graph

2. Modal day data
   14 days of glucose results over 1 day time frame

3. Ambulatory glucose profile (AGP)

You can use all these to manage your diabetes
**Daily trend graph examples**

In this example the glucose levels are going high over night. With extra bolus insulin the glucose comes down during the day. What needs to be done?

Basal has been increased from 4am

By increasing the basal the glucose has started to come down to nearer the glucose target

---

**Dexcom G5 - STEP 4 - Using AGP and trend data**

Glucose starting to rise from 2-4am
Example of Modal day graph

Looking at hundreds of glucose results dotted onto a graph can be confusing. The Modal day graph includes all the glucose results over a 2 week period and displayed in one 24 hour time frame.

Example of AGP

Diasend profile

- This shows the glucose values over 14 days
- The orange line shows the median of all the results
- The pale blue areas is the 10-90% percentile range
- The dark blue area is the 25-75% range
- The wider these areas the bigger the variation in glucose levels
- The average glucose level for this period is 10.2 mmol/L

There is a single curved line giving the average (median) of all glucose results. On either side of this line are shaded areas which identify how close to the average you are.

The further away you are from the curved line (median) the more erratic your glucose results are.
**Ambulatory glucose profile (AGP)**

**How to use the AGP:**

1. Look at the median glucose over a 2 week period
2. How close are you to target?
3. What is the variability like i.e. how wide are the glucose levels
4. How often have you had a hypo or hyper or been close?

The profile will show a rise and fall of glucose levels at certain times of the day and whether you are consistently high, low or within target range.

**Start by looking at the risk of a hypo.**

- Diasend software will show results in the percentile ranges 10-90% and 25-75%

If hypos are a problem look at the common time they occur or are likely to occur.

Think about:

- When did you last have insulin?
- Are you counting carbohydrate correctly?
- Are you within your target range overnight?

**Are your glucose levels high most of the time?**

Think about:

- Has insulin been omitted?
- Have you given insulin after a meal?
- Are you counting carbohydrates correctly? Are you over treating a hypo?
- Have you been unwell?
- Does it occur at certain times of the week?

**Remember!**

It may be difficult to find a pattern because the range of glucose levels are too wide. Therefore you may need to reduce variability first.

Look at a 2 week profile and focus on overnight glucose level being in or nearer target range.

Then review the profile and see if you can identify any times of the day you are too high or too low thinking about the points earlier.

**NOTES:**
Ambulatory glucose profile (AGP) provides an average of glucose levels over past 14 days

Statistics
Number of values: 2037
Values per day: 70.2
Period average (mmol/L): 10.2

Values above goal (10 mmol/L): 900
Values within goal (4-10 mmol/L): 893
Values below goal (4 mmol/L): 244

Highest value (mmol/L): Hi (10/05/2016 11:53)
Lowest value (mmol/L): Lo (19/05/2016 15:24)
Standard deviation: 5.7

This value of 10.2 mmol/L shows the average of all blood glucose results over past 14 days linked to HbA1c
Ambulatory glucose profile (AGP) provides an average of glucose levels over past 14 days

During the day the glucose is stable

What information can we get from this graph?

- The glucose level (highlighted in red) is stable during the day and within or close to the target range of 4-10 mmol/L
- The day time glucose from 08.00 - 16:00 can vary a lot from the median although the average is within target
Ambulatory glucose profile (AGP) provides an average of glucose levels over past 14 days.

What possible problems can we get from this graph due to the rising glucose at 9pm-midnight?

POSSIBLE PROBLEM: Not enough basal insulin from 21:00 (9pm) - midnight.
SOLUTION: Increase basal rate 9pm-midnight to prevent a rise in glucose but reduce the background from midnight to 6am to avoid going too low in early hours of morning.

POSSIBLE PROBLEM: Possibly eating supper with no insulin causing glucose to rise until midnight then basal insulin brings it down.
SOLUTION: Give insulin with supper but reduce the background rate at midnight - 6am to avoid a hypo later.
Ambulatory glucose profile (AGP) provides an average of glucose levels over past 14 days

What possible problems can we get from this graph due to the consistently low glucose at 3am - 8am?

**PROBLEM:** Lower limit set at 4.0 mmol/L, profile shows glucose <4 mmol/L more than 10% of the time (light blue area extends below lower threshold of 4 mmol). Therefore increased risk of hypoglycaemia

**SOLUTION:** Decrease basal rate from 3am - 8am to prevent a hypo
Remember!

- Choosing to use the CGM means a new way of glucose monitoring
- CGM does not replace blood glucose monitoring
- Ongoing training and reviews are essential to interpret the increased number of glucose readings
- Trend arrows help to give you extra information about which direction your glucose is travelling in and how fast
- Insulin dose adjustment tools can help you decide how much total insulin to give
- DO NOT turn off your alerts they are there is help you.
- DO NOT use your CGM if you are taking paracetamol

**Summary of glucose target aims**

Aim for an average glucose of 8 mmol/L, most of the time, you should then be close to the target HbA1c result of 6.5%

Aim for a glucose level not rising more than 2 mmol/L after a meal

Aim for very few hypos with improving control

Continue to download your data with an educator to review your targets

**Date for next CGM review:**

________________________________________________________________________

________________________________________________________________________

**Diabetes team contact details:**

________________________________________________________________________

________________________________________________________________________

**Diabetes control changes as you get older.**

**Ongoing education is the key to better glucose control**