

B: Practical Skills

B1: Glucose meters

Blood glucose meters help you to keep an accurate idea of your blood glucose levels; they are a key part of your diabetes management. Your diabetes team will discuss the different types to suit your needs.



The Accu-Chek Aviva Expert meter will help calculate insulin doses based on your current blood glucose level, carbohydrates to be eaten and correction dose required. The Optium Neo meter will check glucose and ketones (blue packaged strips for glucose and purple for ketones).

There are many other meters available but we recommend staying with the meters provided, as these have a proven level of accuracy. Meters must be compatible with Diasend to be uploaded at clinic, which not all meters are.

Meter tips:

- When you come to clinic bring all your meters as we will download them and go through the results with you.
- Explore your meter and look at your average blood glucose readings.
- Make sure the time and date are correct on the meter.
- If you would like to download your meter onto Diasend from home, ask your diabetes nurse for more information.
- If your meter stops working, contact the company who makes it to request a replacement.
- For your meter to keep accurate results it is important to use it properly and keep it clean. You will also been shown how to test your meter with control solution.

- Replace your meter battery when it indicates to do so and take some spare batteries on holiday.

Glucose and Ketone test strips: These are specific for each meter so it is important your GP prescribes the correct strips. You will need at least 5 per day and some spare. Your diabetes nurse will inform the GP of the type of strips you will require. To test blood ketones you will need different strips which can only be used on certain meters.



B2: Blood Glucose checking

Procedure for checking / supervising blood glucose check

Equipment needed: Blood glucose meter, test strips, finger-pricking device, lancet, sharps bin and cotton wool or tissue.

1. Ensure hands are washed and dries them thoroughly. (If hands are cold, run them under warm water or shake them to warm them up).
2. Insert new lancet or advance the fastclix lancet as taught.
3. Insert test strip into or advance test strip from blood glucose meter.
4. Prick the side of the finger (it is less painful than the finger tips) and wipe away the first drop of blood with cotton wool or tissue.
5. Squeeze a small drop of blood by milking the finger from the base to the tip.
6. Hold the test strip to the blood and allow the strip to suck up the blood. The meter will beep or the display will start counting down when enough blood is received.
7. After a few seconds the blood glucose level should appear on the screen. (If an "error" appears on screen this may be due to insufficient blood sample therefore repeat the test. If problem persists, refer to meter reference guide or contact parents for advice).
8. Dispose of lancet and test strip as taught.
9. Record blood glucose result.

There are many different types of blood glucose meter, each requiring a slightly different method of use. The above is only a guide; always perform/supervise the test as taught by the children's diabetes nurse specialist.

Blood glucose checking tips:

- Make sure your hands are clean before you begin. Use water rather than wet wipes (wet wipes contain glycerine that could alter the result).
- Prick the side of the finger, not the middle, or too close to a nail. Using the side is less painful.
- Use a different finger each time and a different part; this will hurt less.
- If you don't get much blood, hold your hand down towards the ground. This should make more blood flow to the fingers.
- Make sure your hands are warm – if they are really cold it's hard to draw blood, and finger-pricking will hurt more.

When to check:

- Before all main meals (breakfast, lunch and tea) - this allows you to correct your blood glucose by adjusting your dose if you are too high or too low.
- Bedtime - to make sure you are not too high or low before bed.
- If you are unwell - this is essential. You may need to check every 2 hours and give extra insulin if blood glucose is high to avoid ketones and DKA.
- In relation to episodes potentially associated with hypoglycaemia, increased exercise or alcohol ingestion.
- If suspected hypoglycaemia, check to confirm. If unable to get to meter quickly treat first, then check.
- If your blood glucose has been high (greater than 8mmol/l) in the day time and you have given a correction dose, recheck within 2-4 hours to see that your glucose level has returned to target range.

B3: Insulin Pens

These hold 3 mls of insulin (usually 300 units) either in cartridges or as disposable pens. Your diabetes team will advise on the most appropriate pen, as it depends on the type of insulin and whether you need 0.5 unit doses or larger doses.



Make sure you have a spare pen (via GP prescription) and choose different colours for the rapid and long acting insulin so you do not get muddled.

Needles

These are attached to the pen and are very fine so that it reduces any discomfort to a minimum. They should only be used once. For children and teenagers the 4 mm needle is recommended.

It is important to be careful with needles and dispose of them safely in the special sharps bin.

Needle bins

These can be obtained from your GP but usually have to be collected by the council when full.



B4: Injection techniques, site care and insulin delivery

Giving injections to your child may seem very worrying at first, both because it is a new skill but also because it can feel at odds with your usual role in protecting your child. These feelings are normal and some people find it useful to remind themselves how much better you are making your child feel by giving them the insulin which their body needs.

Remember you are not alone. A Diabetes Nurse or a member of the ward team will be there with you at first until you feel you can help manage this without their help. By using the guidelines every time, it will soon become part of your daily routine.

Please talk to one of the CYP diabetes nurses if you would like further ideas around supporting injection times. Talking through and involving children in a way that is appropriate for their age, distraction techniques and using soft toys for role play are some of the strategies which can help.

Insulin

- Check that the insulin you are to use has not passed its expiry date. Once insulin is in use, it lasts for four weeks and may be stored at room temperature. Unopened insulin must be stored in the fridge.
- Ensure that you give the injection in accordance with the insulin type and the manufacturer's instructions. Short acting insulin such as Novorapid is to be given as a bolus and is usually injected 15-30 minutes before food. Long acting or basal insulin such as Levemir is given at a set time of the day and is not related to food. Your Diabetes Nurse will advise you on what you should do.

Injection technique and rotation

- Observing the nurse perform the first injection will enable you to see the correct technique, sites and also how to support your child during the procedure.
- It is important to move around the injection area and to change sites as fatty lumps (lipos) can develop if you keep using the same area. These lumps can affect the absorption of the insulin and lead to swinging blood glucose levels.
- If you are unsure ask the diabetes team to help and advise you.
- Remember to regularly check injection sites for lipos as:

“Lipos can cause Hypos”.

2. Hands On (palpation)



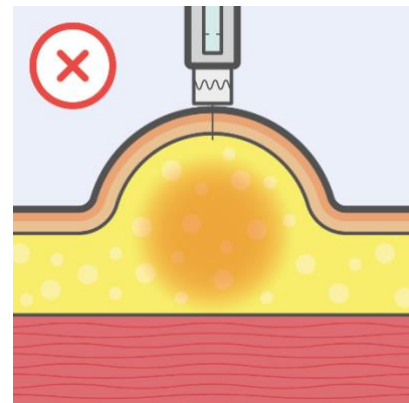
Use firm downward pressure



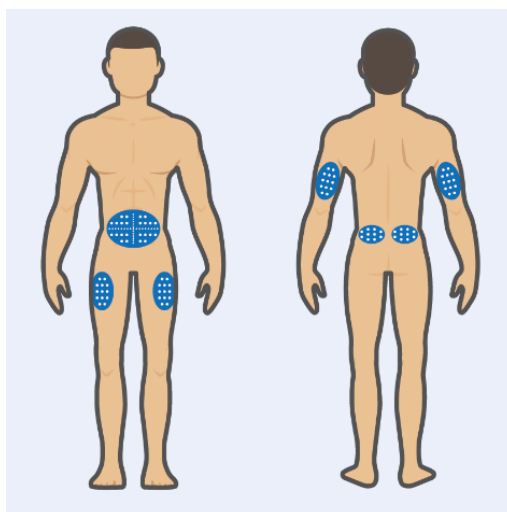
Feel for the difference in tissue structure



You can mostly feel the edge of the lipo as a harder ridge



Injection sites



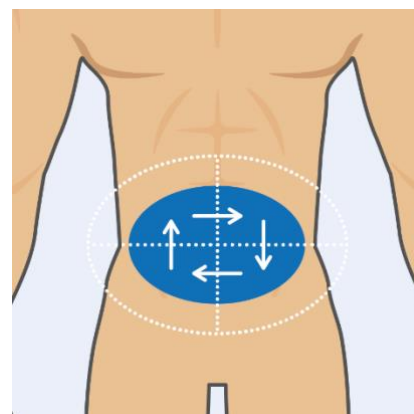
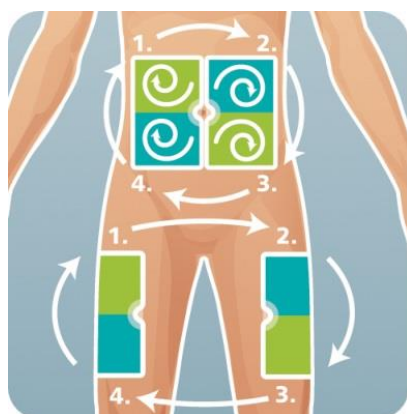
The preferred site is the top of the buttocks. This area has the most subcutaneous (fatty) tissue which means insulin is less likely to be injected into the muscle. Injecting into the muscle can be more painful and insulin absorbed quickly and unpredictably.

If your child is about to do some activity or exercise such as running or football, insulin injected into the legs will be absorbed very quickly.

Site rotation pattern suggestions

There are several rotation methods (see below) that help to prevent excessive use of one injection site and ensure the ideal absorption of insulin and will reduce the risk of lipos.

Rotation between sites and within sites



Injection Technique



Children under the age of seven will usually need someone to do the injection for them. If your child needs an injection to be administered for them by a member of staff (school or hospital) or a carer, then a safety needle (BD Autosheild 5mm) is required to prevent needlestick injuries.

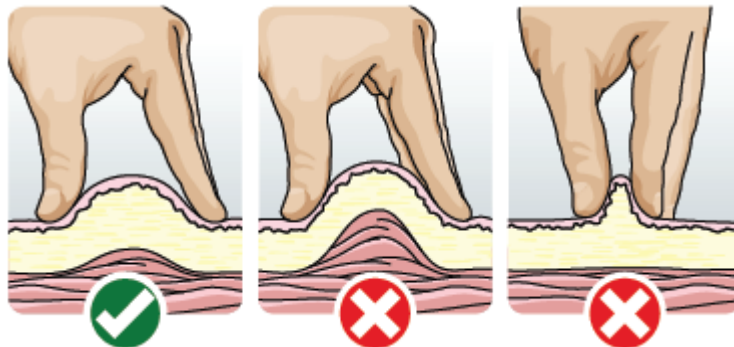


At all other times use of the shortest needle possible is recommended and these currently are 4mm in length.

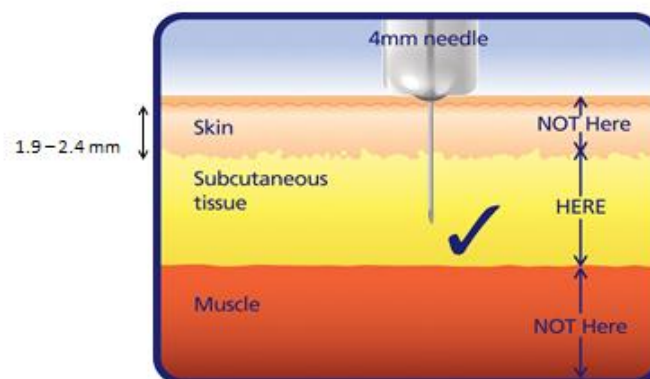
Talk to the CDNS about coping and distraction techniques which may help. If you have already tried these strategies an appointment with the diabetes team psychologist may help.

- Remove the pen cap
- Attach a new pen needle
- Prime the needle with 2 units of insulin, holding the pen with needle upright

- Once a drop of insulin has been seen, the pen is ready to use. If a drop of insulin has not been seen - repeat the procedure
- Dial the number of units calculated
- Choose the injection site and lift a wide skin fold. This helps to hold the skin steady and avoids injecting into the muscle. A lifted skin fold is recommended for all ages but especially 2-6year olds.



- Inject the pen device needle at 90° and press the button/plunger as far as it will go. The dial will reset back to zero to indicate that the dose has been



administered

- Count to 10 before removing the pen device to reduce insulin leakage
- Following the injection, remove the pen needle from the pen using the outer cover (do not try to replace the inner needle cover) and discard carefully in the sharps container
- Replace the pen cap on the pen device

- Always remove the needle after every injection to minimise the risk of accidental injection and prevent reuse of a blunted needle which will be more painful and cause more trauma to the skin.
- Remember that fast acting bolus insulin should be injected into a different site to long acting basal insulin.

Your Diabetes Nurse will help you with this and will be able to advise you in the first few days following diagnosis.

Safety devices

Recent European legislation requires that if a safety needle is available, those caring for a person requiring an injection should use this device to protect themselves from a needlestick injury and exposure to blood borne infections.

As the shortest available safety needles are currently 5mm in length the risks to the healthcare workers or carer need to be balanced with the risk of intramuscular injection and subsequent hypoglycaemia or glycaemic variability.



The CYP diabetes team recommend ward staff demonstrate to CYP and families injection technique with a 4mm needle (on a soft toy or similar). Actual administration by the nurse will then be done using the safety device (see picture above). School staff and carers will also be encouraged to use this device. Once your child is able to inject themselves the 4mm pen needle will be used.

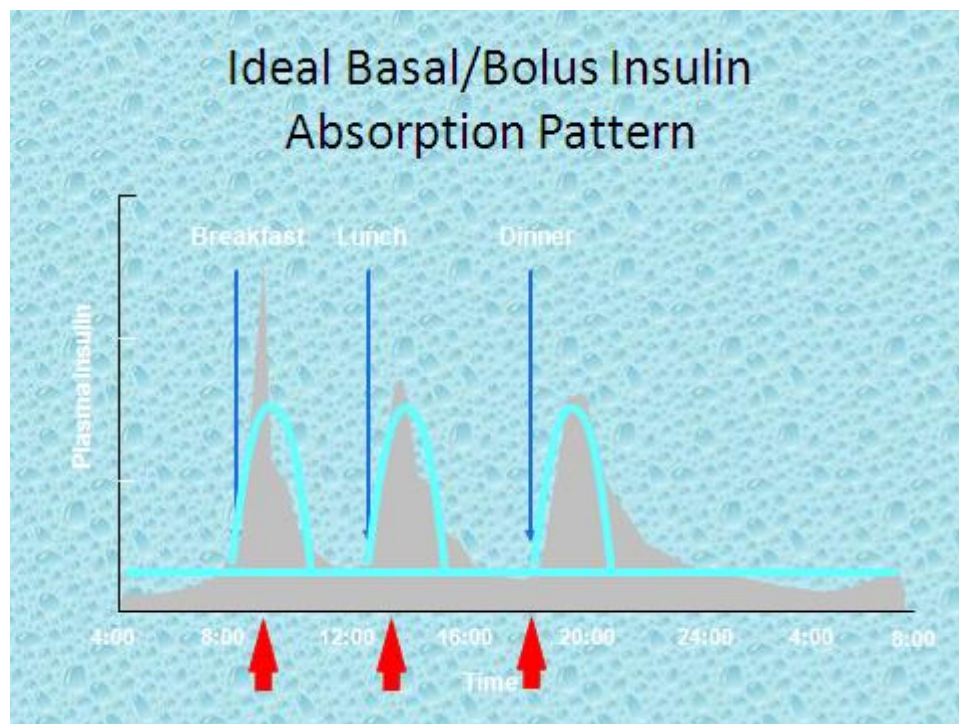
B5: Guide to insulin regimes

The two most common types of insulin regimes used are **Multiple Daily Injections (MDI)** and **Insulin Pump therapy (IPT)**, also known as continuous subcutaneous insulin infusion or CSII.

Both of these involve a basal and bolus insulin being delivered and so are sometimes referred to as “Basal bolus regimes”.

Multiple Daily Injections (MDI)

MDI involves two different types of insulin - a fast acting insulin given as a **bolus** with each meal or snack and a long acting **basal** insulin given once or twice a day.



Long acting insulin (Basal)

Long acting insulins such as Levemir are given once or twice daily to provide a low level of background insulin (Basal). This long acting insulin provides a steady release to keep the blood glucose level stable throughout the day and night. Long acting insulin has a slower onset time and lasts much longer than the fast acting bolus insulin. It lasts 20 - 24 hours.

The long acting insulin dose may be split and given morning and evening. Where possible the long acting insulin should be given at a similar time each day.


The long acting insulin is required even when not eating or drinking. It is not fast enough to be used for food or corrections.

Insulin Type	Proprietary Name – use when prescribing	Taken	Onset	Peak	Typical activity profiles
Long-acting analogue insulins					
Insulin Detemir	Levemir®	Once or twice a day	2-4 hrs	6-14 hrs	
Insulin Glargine	Lantus®		2-4 hrs	No peak	
Insulin Degludec	Tresiba®	Once a day	30-90 mins	No peak	

Fast/Rapid acting insulin (Bolus) Fast acting insulin is given for the food to be eaten and when needed to correct a high blood glucose (BG) level.

Fast acting insulins such as Novorapid are absorbed more quickly than basal insulin and lasts for 3-5 hours. They are designed to be given before food/drink containing carbohydrate (CHO) to prevent a high blood glucose level or correct back into the target range (4-7mmols/l).

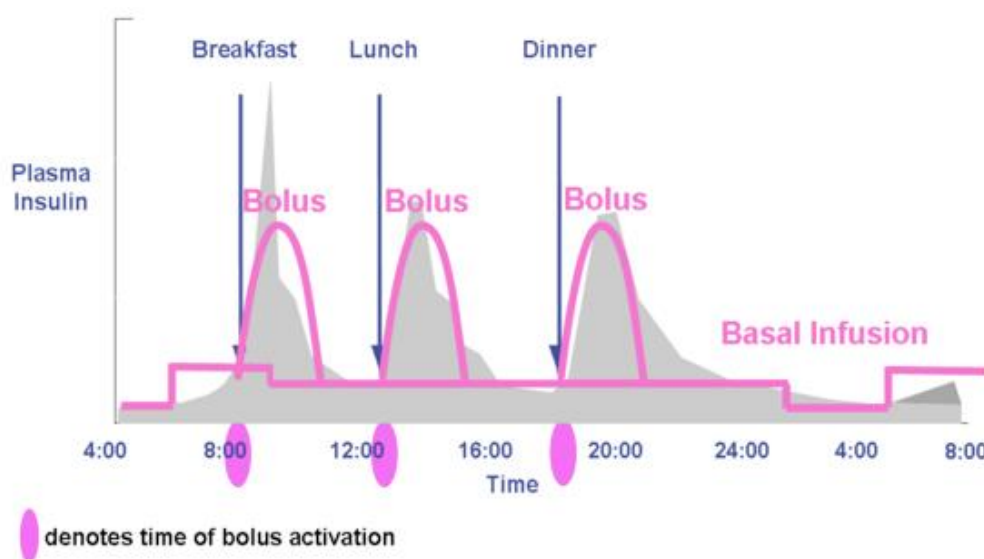
- The insulin to carbohydrate ratio (ICR) is the calculation used to work out how much insulin to give before each mealtime. Your diabetes team will guide you re what insulin to carbohydrate ratios to use. It is not uncommon to use different insulin to carbohydrate ratios at each meal. Fast acting insulin works best if given 15-30 minutes before food.
- The Insulin Sensitivity Factor (ISF) or Correction dose is the amount of insulin required to bring the BG level back into the target range (4-7mmol/l) e.g. if 1unit lowers the BG level by 5 mmol/l, this will be written as 1:5.

Insulin Type	Proprietary Name – use when prescribing	Taken	Peak	Duration	Typical activity profiles
Rapid-acting analogue insulins					
Insulin Aspart	NovoRapid®	Take 15-30 minutes before eating	1-3 hrs	2-5 hrs	
Insulin Lispro	Humalog®				
Insulin Glulisine	Apidra®				

INSULIN PUMP THERAPY

An insulin pump is a battery operated device which delivers only fast acting insulin. It is programmed to deliver insulin in small amounts constantly throughout the day to mimic the working pancreas and this is known as the pump basal rate. At mealtimes a bolus of insulin is given by pressing a sequence of buttons to deliver the mealtime bolus after carbohydrate counting and if needed a correction dose.

- Long acting insulin is not used in insulin pump therapy
- Comprehensive pump training will be provided if you choose to use this method of insulin delivery.



Multiple daily injections and insulin pump therapy offer intensive management and aim to replicate the workings of a normal pancreas whilst also allowing more flexibility, tiny dose adjustments and more options so that diabetes fits your lifestyle.

B6: Diabetes Technologies

Diabetes Technology options are available to support diabetes care. These include Insulin Pump Therapy, continuous and intermittent glucose monitoring and automated insulin delivery systems.

Insulin Pump Therapy

Insulin Pump Therapy (IPT) is another way to deliver insulin under the skin. Insulin is infused in the background over 24 hours (basal insulin) and boosted to match meal carbohydrate or corrections (bolus).

IPT can provide more flexibility and further options but for some people they can feel like more work.

At Leeds we offer a number of insulin pumps including those manufactured by

- Medtronic
- Insulet
- Tandem
- Roche
- Ypsomed

Each pump comes with a four year warranty and therefore a four year commitment to the chosen pump. Attending our “Pump showcase” sessions, which are held each month, enables comparison of key features. Further discussion with the team helps to ensure individual needs and preferences are considered to ensure the most suitable choice is made.

If you would like to know more about pump therapy, please ask your diabetes nurse or any of the diabetes team. There is an expectation that the family will work closely with the team and a change to this therapy will involve extra nurse led clinic visits, before and after pump start.

Intermittent Glucose monitors

Intermittent scanned glucose sensors without an alarm can reduce the number of BG checks but do require a confirmation check to calculate insulin doses. Sensor readings are provided every 5 minutes along with an arrow showing the direction of change. The lag time is approximately 10 minutes.

Scans must be performed at least 5 times a day and preferably 10-20 times a day to avoid breaks in the data.

Libre flash glucose sensors last 14 days and are worn on the back of the upper arm.

It can be used by someone on injections or insulin pump therapy

Continuous Glucose Monitors

Real time Continuous Glucose Monitoring (CGM) can be used with insulin pump therapy or injection therapy and can reduce the variability of glucose levels. This will in turn increase the Time in Range (TiR) when the blood glucose is between 4 and 10mmols/L.

Sensors will show a sensor glucose (SG) reading every 5 minutes and an arrow showing the direction of change. However SG readings lag behind BG readings by approximately 5-10 minutes.

Automated insulin delivery (Closed Loop) systems

Automated insulin delivery (Closed loop) systems consist of three parts

- Insulin Pump
- Continuous Glucose Monitor
- Algorithm that determines insulin delivery

They can improve Time in Range and minimise glucose variability by suspending and also increasing insulin delivery based on the sensor glucose (SG).

Technology is evolving all the time and we are committed to ensuring our children and young people with diabetes have access to the most appropriate technology to help them manage their diabetes. This means an individualised approach and also an understanding of when is the best time to introduce the options available.

The most important factor however in achieving excellent diabetes care is individual knowledge of the child or young people and their family about their diabetes. This commences at diagnosis and is built on over time. Our diabetes team is here to support all families to ensure they have all the knowledge and skills required to integrate diabetes care into everyday life.

B7: Monitoring and taking care of your diabetes

Your body works best if your blood glucose levels are not too high and not too low. People who do not have diabetes have blood glucose levels that stay between 3.5 and 7 mmol/L. If you have diabetes, the goal is to keep your blood glucose levels between 4 and 7 mmol/L before meals and on waking, and between 5 and 9 mmol/L approximately 2 hours after meals most of the time. Careful balancing of your insulin doses, diet and exercise will help towards achieving this.

Measuring your blood glucose is the only way of knowing exactly what your levels are. If you go by how you feel, you will only know when you are very low or very high. Without any reading, your diabetes team will find it more difficult to advise you, so it is important to bring your meter to clinic.

Daily blood glucose monitoring

This can be done at home, school or when out and about by doing regular finger prick checks, with the equipment we will give you (see blood glucose checking).

It is recommended that you check at least before each meal, before bed and when you feel low (hypo) or unwell. If your glucose level is high (greater than 8 mmol/L) it is important to check that it has come back to normal within 4 hours.

The children who obtain optimal glucose levels check their BG on average 5 to 7 times each day and achieve 70% of their results in the target range.

Extra checks may be needed at other times such as during illness, following a hypo, stressful periods such as exam time or during a growth spurt.

Patterns and trends of blood glucose levels that are too high or too low are more easily identified with regular monitoring.

If blood glucose levels are significantly high (14mmol/L or more), check for blood ketones.

If blood ketones are above 0.6mmol/L and rising, immediate action must be taken because you are in danger of becoming seriously ill very quickly. (See sick day rules).

THE IMPORTANCE OF MEASURING AND MONITORING BLOOD GLUCOSE LEVELS

The number displayed on the meter tells you how much glucose is in the blood stream at the time that the test was carried out. It is measured in units called millimols per litre.

Recommended blood glucose target ranges for children with diabetes are:-

On waking	4 to 7 mmol/L
Before meals at other times of day	4 to 7 mmol/L
After meals	5 to 9 mmol/L
Before driving	At least 5mmol/L

The blood glucose result indicates the action you will need to take to manage your diabetes well on a day to day basis.

Insulin doses are adjusted according to patterns and trends of the blood glucose levels to achieve better control.

If the blood glucose level is high e.g. 8mmols/L or more before a meal then additional insulin is recommended. This is called a CORRECTION DOSE.

This extra insulin is added to the food bolus insulin which has been calculated from carbohydrate counting. Within 2-4 hours or by the next meal the blood glucose level should then return into the target range. You will be informed of your correction dose ratio by the diabetes team. The correction dose ratio will change over time as you grow.

Looking for patterns and trends of rising or low blood glucose levels, and looking for reasons for these, will give you clues as to the changes required to get back to your target level. Before changing insulin doses you need to consider other things, such as injection sites, rotation, exercise and food (see insulin adjustments and problem solving).

CONTINUOUS GLUCOSE MONITORING (CGM)

Continuous glucose monitoring may also be recommended over time. This is a way of analysing your glucose results in more detail and can be very informative in assisting with insulin dose adjustment, carbohydrate ratios and exercise management.

B8: Average blood glucose levels and meter uploads.

At home


The HbA1c level effectively represents average glucose levels over a period of 6-12 weeks. A way of monitoring how you are doing between clinic visits is by looking at your average blood glucose levels over 1-2 weeks and you can do this on your glucose meter. The relationship between an average glucose level and HbA1c is shown in this chart below.


HbA1c(mmol/mol)	Average glucose(mmol/L)
20-42	3.8-7
<50	<8.1
50-60	8.1-9.5
61-70	9.6-11.1
71-80	11.2-12.5
81-100	12.6-15.4
>100	>15.4

In order to meet the national target for an HbA1c of 48mmol/mol or less, we would suggest that you aim for a weekly average blood glucose level of 8mmol/L or less (It is important to note that the average blood glucose level is useful only if at least 4 blood glucose tests are done per day). The screenshots below show how you will find average glucose levels on an Accucheck Aviva Expert meter.


Main Menu > My Data > Reports > bG Averages


1.




From the Main Menu, select My Data and press .


2.



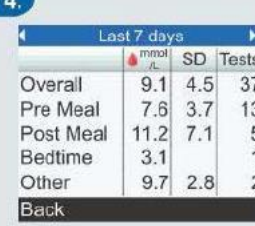
Select Reports and press .

3.



Select bG Averages and press .

4.



The blood glucose averages are displayed.

	mmol/L	SD	Tests
Overall	9.1	4.5	37
Pre Meal	7.6	3.7	13
Post Meal	11.2	7.1	5
Bedtime	3.1		1
Other	9.7	2.8	2

It is also possible to look at the percentage of results within target as shown below. The aim is to try and have at least 70% of the results between 4-10mmol/L.

Main Menu > My Data > Reports > Target



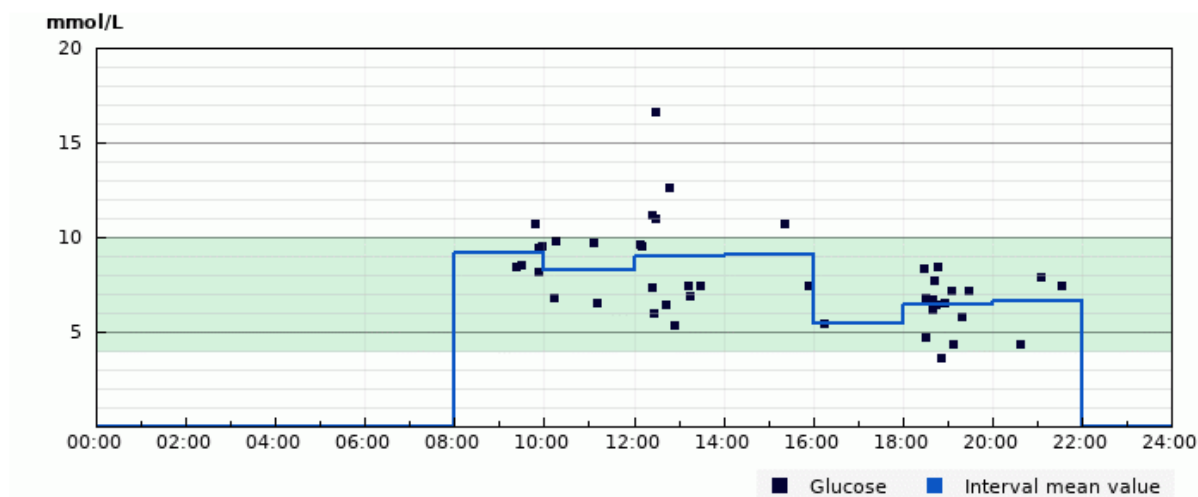
If your blood glucose average is regularly above 8mmol/L or if you are having hypos more than 10% of the time please contact the clinic so that we can help to see if any changes need to be made to insulin doses or timing.

In Clinic

When you attend your diabetes outpatient clinic you should expect that your meter(s) will be uploaded and then the results discussed with you at your consultation. The same will apply to your pumps if you are on a pump. It is therefore essential that all your meters are brought to clinic and that the time and date is correct on the meter. If you wish to obtain a new meter, then please check with the team that it will upload.

The Diasend system is used in many hospitals and enables the uploading of several different meters and the results displayed on the same tables and graphs. Some examples are shown below.

All blood glucose values over the last month plotted against time, with blue line showing mean (average) value. Note cluster of high levels at lunch time and late afternoon.



This is a summary of results showing blood results between 4-10mmol/L in green, above 10mmol/L in yellow and less than 4mmol/L in red. This helps to spot any patterns in high or low glucose levels so that appropriate adjustments can be made.

■ <4.0 mmol/L ■ within target area ■ > 10.0 mmol/L m tagged values were typed in manually by the patient k ketones (mmol/L)

	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Daily totals
Tu 5/5													6.0				5.5		3.7	4.4					Average (4): 4.9mmol/L
We 6/5											6.8		9.6						7.8						Average (3): 8.1mmol/L
Th 7/5													5.3						6.2						Average (2): 5.8mmol/L
Fr 8/5												6.6				7.3			6.6		4.4				Average (4): 6.3mmol/L
Sa 9/5													7.4						4.7						Average (2): 6.1mmol/L
Su 10/5													7.4						6.8			7.5			Average (3): 7.2mmol/L
Mo 11/5										8.5			16.6			10.8				7.2					Average (4): 10.8mmol/L
Tu 12/5										9.4			11.2							7.2					Average (3): 9.3mmol/L
We 13/5											9.8		11.0						8.5						Average (3): 9.8mmol/L
Th 14/5										8.2			6.4						6.4						Average (3): 7mmol/L
Fr 15/5										8.5			7.3						8.4						Average (3): 8.1mmol/L
Sa 16/5										10.7				6.9					6.5			7.9			Average (4): 8mmol/L
Su 17/5												9.8	12.6							5.8					Average (3): 9.4mmol/L
Mo 18/5										9.5			9.5						6.8						Average (3): 8.6mmol/L

Summary of results over the last month: The goal is to have at least 70% of your blood glucose levels between 4-10mmol/L and no more than 10% low levels.



Comparison of results from meter downloads for children with HbA1c less than 58mmol/mol (7.5%) and greater than 80mmol/mol (9.5%). Results were taken over 1 month and at least two blood glucose results had to be recorded every day.

Parameter (HbA1c) (9.5%)	Less than 58 (7.5%)	Greater than 80
Average BG	8.7 mmol/l	14.2 mmol/l
Average BG 16.00-18.00 hours	10.0 mmol/l	14.3 mmol/l
Average BG 18.00-20.00 hours	10.0 mmol/l	15.8 mmol/l
Standard Deviation	4.6	6.8
% in normal range	57%	28%
% < 4mmol/l	12%	7%
No of measurements per day	5.3	3.7

Our clinic targets:

Average BG (over 14 days)	8mmol
Standard deviation (variability)	3
Time in range (4-10mmol)	70%

B9: Uploading and sharing data

The data collected on the technology you have been provided with is to aid the management of your diabetes. This can be downloaded and viewed by yourself and your diabetes team. This allows a visual representation of your blood glucose levels and other information from your meter over a set time e.g. 2 weeks. Changes to your diabetes management can be made from this data to optimise your diabetes control.

Diasend allows easy uploading of information from most, but not all, glucose meters, insulin pumps, CGM and mobile apps. For technology that does not upload to Diasend, other companies have different platforms to download their devices. Please discuss your technology with your nurse for further information.

[How to create an account](#)

- Either - go to www.diasend.com and click register, **OR** follow the link in the email sent by clinic
- Set up log in details with your email as your username, and a password
- Enter personal information
- Share data - In order to share your data, your diabetes nurse will provide you with our clinic code
- Confirm registration by approving terms and conditions

How to start uploading

1

Start diasend® Uploader

Double click on the diasend® Uploader icon on your computer (if you have a Mac please go to the "applications folder" or "launchpad" to find diasend® Uploader).



2

Connect the device cable

Connect the cable for your device to a USB port on your computer.

NOTE: To download data from an Omnipod® PDM to a Mac computer manufactured before mid 2012, running OS X El Capitan, it is recommended that you use a USB hub.

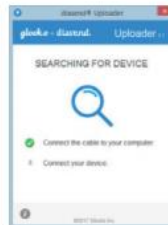


3

Connect your device to the cable

Connect the device to the cable or place it in front of an IR dongle.

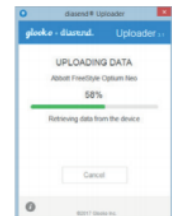
NOTE: For specific instructions on how to upload your device use the diasend® Personal Quickguide at support.diasend.com.



4

Device will start to upload

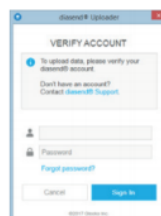
Do not unplug your device until the uploading process is completed.



5

Verify your account

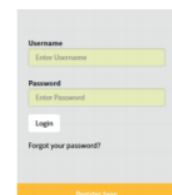
Enter your username (entire email address and the password you created when registering for your account). Click Sign in.



6

View your data

Log in at www.diasend.com and view your data.



Pictures sourced from: www.diasend.com

B10: HbA1c or Glycated Haemoglobin

HbA1c or glycated haemoglobin is an indication as to what your blood glucose levels have been over the last 6-12 weeks.

What does it measure?

Haemoglobin is present in red blood cells (the Hb of HbA1c) - this is what makes your blood red. Glucose sticks to red cells and the more glucose there is around in the blood, then the more red cells have glucose attached. The average lifespan of a red cell is 120 days and therefore if we measure how many red blood cells have glucose attached to them, it gives us a guide as to the glucose levels in your blood over the last 120 days (3 months).

What it does not measure?

This can be the confusing bit. It is not a measure of blood glucose as you would get if you are doing a finger prick and testing your blood with a meter. It does not measure sudden changes in your blood glucose and it will not reflect a single poor day or week.

What are normal levels and how does it relate to your blood glucose?

Small blood vessels run throughout the body and get damaged by persistently high blood glucose levels which lead to long-term complications of diabetes such as kidney and eye problems. An HbA1c target level of 48 mmol/mol (6.5%) or lower is ideal to minimise the risk of long-term complications. This requires hard work to achieve, but is worth it. It is important to note if HbA1c levels are above the ideal target of 48mmol/mol or less, that any reduction in HbA1c level reduces the risk of long-term complications.

We will support children and young people with type 1 diabetes and family members to safely achieve and maintain their individual agreed HbA1c target level.

How often is it measured?

We aim to measure HbA1c at every clinic visit, at least every 3 months. If it is above 69 mmol/mol (8.5%), we will arrange more frequent appointments to provide you with additional support. After diagnosis of Type 1 diabetes, the first 2 years are really important. Research has shown that achieving target glucose levels and an HbA1c less than 48mmol/mol within the first 12-24 months is protective of future health. We will help you to reach this glucose target within 3-6 months of diagnosis and maintain for as long as possible, by proactive management, using technology and providing practical and emotional support to your family. The First Year of Care Pathway is to help achieve a good start with diabetes.