

Making a decision about managing type 1 diabetes

What is this leaflet?

This leaflet is for people with type 1 diabetes.

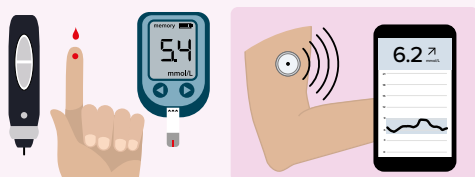
It can help you decide between the different technology available to manage diabetes.

There are some parts for you to fill in.

You should go through this leaflet and then talk to your diabetes team.

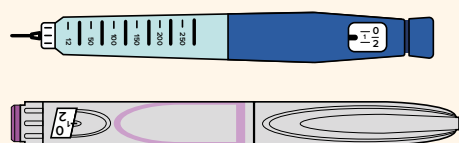
About type 1 diabetes	Page 2
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Measuring glucose



About continuous glucose monitors (CGM)	Page 6
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Insulin and insulin pens



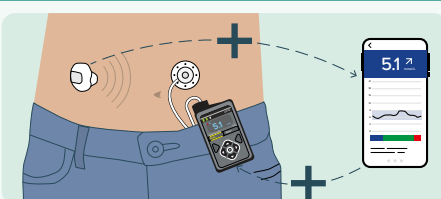
About insulin and insulin pens	Page 8
Choosing an insulin pen	Page 9
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Insulin pumps



About insulin pumps	Page 10
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Hybrid closed loop systems



About hybrid closed loop systems	Page 12
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2 About type 1 diabetes

Type 1 diabetes is an autoimmune condition in which your body destroys insulin producing cells.

Insulin is important to manage glucose levels.

Without insulin, glucose in your blood becomes too high. Insulin takes glucose from the blood to cells where it can be used for energy.

If glucose levels are too high over time, it can cause damage to your heart, eyes, feet and kidneys.

You can reduce the chance of getting these complications by managing your glucose levels carefully and taking the right amount of insulin.

You need to take insulin every day and you will learn how to adjust your insulin dose to meet your needs.

It is a lifelong condition but you can still have a healthy and active life.

About measuring glucose

Hyperglycaemia (hyper) is when glucose levels are too **high** (usually above 13mmol/l)

Hypoglycaemia (hypo) is when glucose levels are too **low** (usually below 4mmol/l)

Glucose in the blood can go up and down:

- when you eat
- due to other things such as stress or exercise

The number of times you measure your glucose each day depends on which monitoring device you are using.

You should measure:

- before meals
- 2 – 3 hours after meals
- before, during and after exercise or activity
- before going to bed
- if you feel your glucose level is dropping

You should measure more often if:

- you are unwell
- your usual routine has changed
- you are travelling across time zones

If you drive a car the DVLA say:

- Measure within 2 hours before you drive.
- Measure every 2 hours on longer or several shorter journeys. See DVLA leaflet INF294 for when you should do a finger prick blood measurement (link on page 14).
- Carry your meter and strips even if you use Flash or CGM.
- If your glucose is less than 5mmol/l eat a carbohydrate snack.
- If your glucose is less than 4mmol/l or you feel hypo, do not drive. You should wait for 45 minutes after your glucose has recovered before you drive again.

How common is type 1 diabetes?

Around 4 out of every 1000 people have type 1 diabetes in the UK.

Around half of newly diagnosed cases of type 1 diabetes are in people over the age of 18.

3 About technology

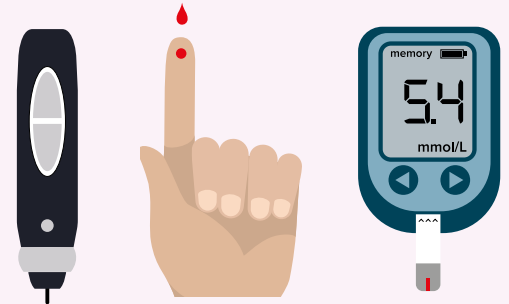
This page shows a summary of the different technology available.

Measuring glucose

Everyone should have a meter, a finger prick device (lancet) and monitoring strips to measure glucose.

Your glucose meter should also measure ketones. There are different brands of meters available and they vary across the country (there is a list of NHS approved meters on page 7).

Your healthcare professional will teach you how to measure your blood glucose and ketone levels using meters.



These use a lancet to get a tiny amount of blood and a sensor strip to measure glucose.

Everyone can also choose a CGM (continuous glucose monitor) to measure glucose.

You wear a sensor on your body which measures how much glucose is in the fluid under your skin. A smart phone or reader device show the results (pages 6 & 7).

Even if you use a continuous glucose monitor (CGM) you should also have a meter as backup.



Continuous glucose monitors (CGM)

Delivering insulin

To begin with everyone is given an insulin pen to deliver insulin

Some people can have an **insulin pump** to deliver insulin (page 4).



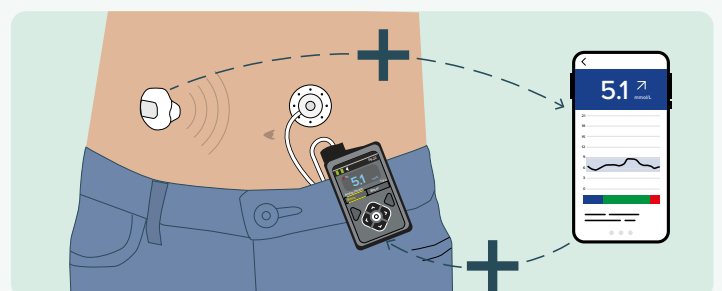
Tubed (or tethered pump)



Tubeless (untethered or patch pump)

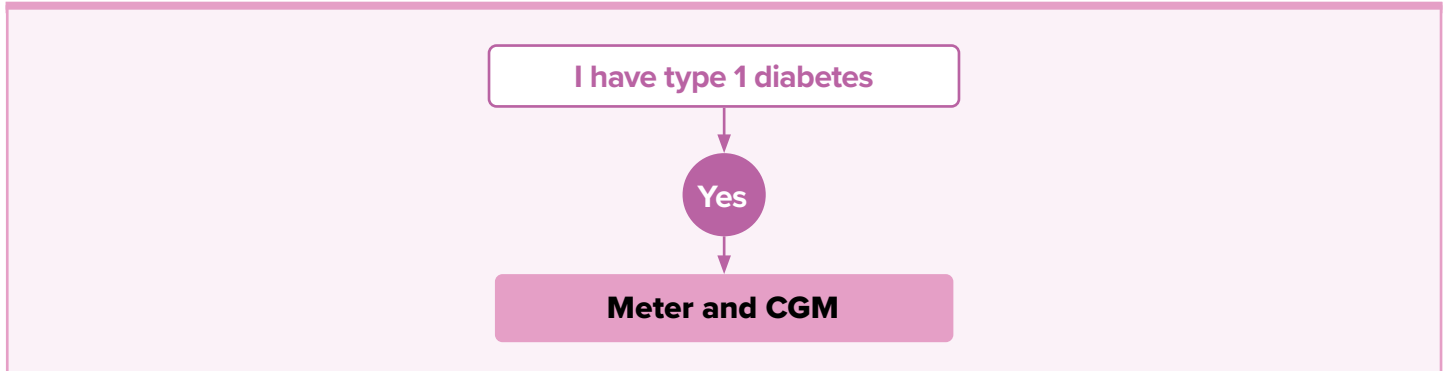
Hybrid closed loop system

Some pumps and CGM can be linked together to make a **hybrid closed loop system** (page 12).

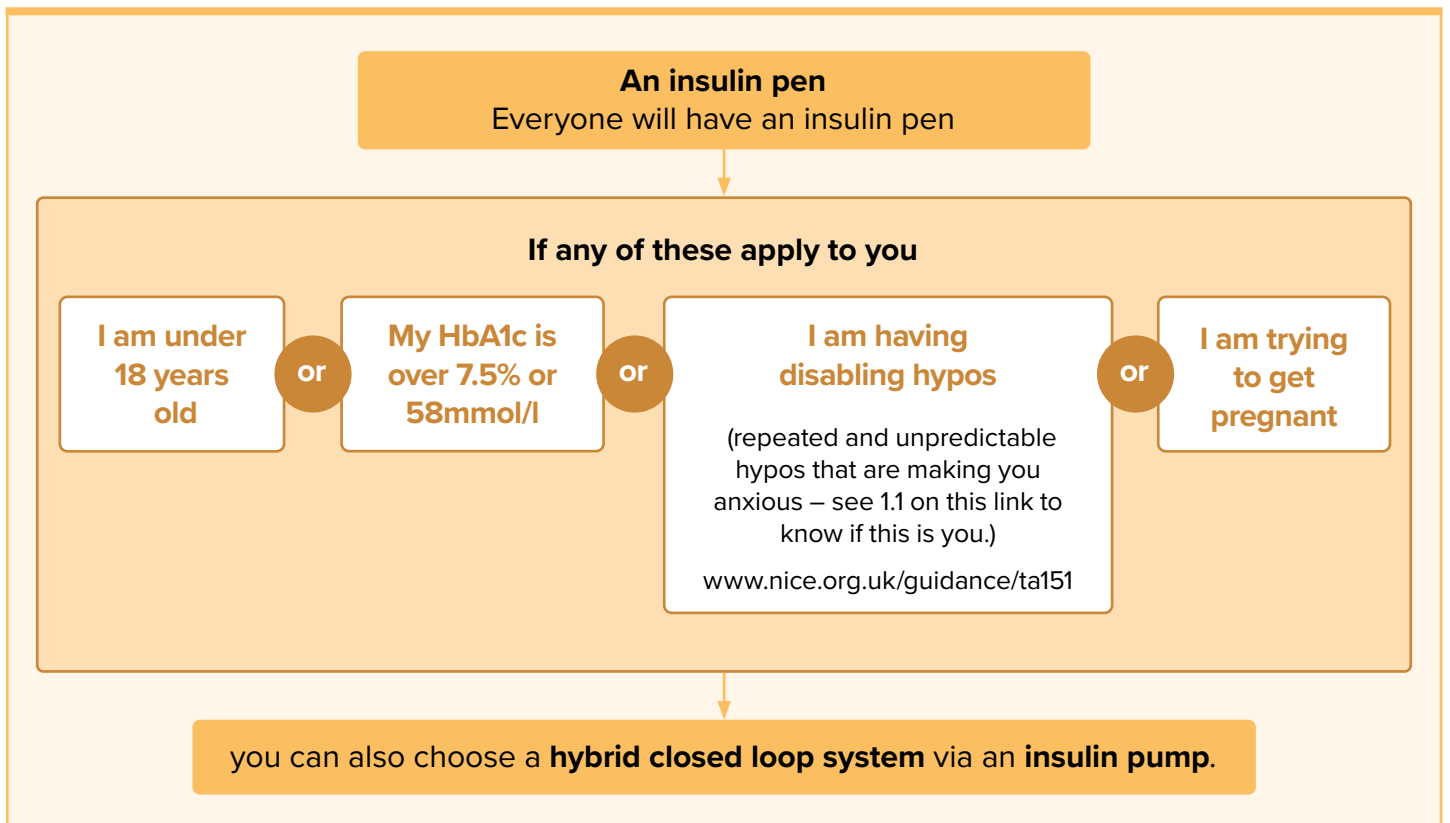


4 Which technology am I eligible for?

Which technology for measuring glucose can I choose?



And which method of delivering insulin can I choose?



Your healthcare professional will show you the different devices that are available to you and you can compare them.

Some devices are bigger or heavier than others. You should be able to see what they are like before you choose.

Managing diabetes is different for everyone and your experiences and preferences will be different from others living with diabetes.

Day to day management of type 1 diabetes can be tiring.

There is a lot to think about and you need to carry devices and monitors all the time.

If you're feeling overwhelmed, speak to your specialist team. They can help you.

5 Choosing how to manage diabetes

Answering the questions on this page can help you understand what is important to you when choosing technology to manage your diabetes.

Your diabetes team can explain which devices or systems are available to you based on your answers. **How you choose to manage your diabetes is up to you. You and your healthcare team should discuss your options.**

Things to think about when choosing technology

Put an 'X' where it applies to you

	I disagree ←	I agree →
My life		
My life or stress levels are unpredictable, for example, a sudden extra shift at work, exams, not being able to eat when I want or need to at work or school	<input type="checkbox"/>	<input type="checkbox"/>
I am not nervous about trying something new	<input type="checkbox"/>	<input type="checkbox"/>
I feel my diabetes is affecting my mental health	<input type="checkbox"/>	<input type="checkbox"/>
Technology		
I need something with a large screen or that has voice control or other accessibility features	<input type="checkbox"/>	<input type="checkbox"/>
I don't mind wearing a sensor on my body all the time	<input type="checkbox"/>	<input type="checkbox"/>
I don't mind more tech attached to my body	<input type="checkbox"/>	<input type="checkbox"/>
Data sharing		
I want to share my data easily with my healthcare provider	<input type="checkbox"/>	<input type="checkbox"/>
I want to share my data easily with my family, teachers, friends or carer	<input type="checkbox"/>	<input type="checkbox"/>
I want something that connects to my smartphone or smart watch	<input type="checkbox"/>	<input type="checkbox"/>
Glucose management		
I have lost the warning signs of hypo (below 4mmol/l)	<input type="checkbox"/>	<input type="checkbox"/>
I want a device that easily shows me if my glucose is stable, rising or falling	<input type="checkbox"/>	<input type="checkbox"/>
I am having severe hypos where other people have to help me	<input type="checkbox"/>	<input type="checkbox"/>
Alarms		
I would like to be able to set alarms for hypo and hyper	<input type="checkbox"/>	<input type="checkbox"/>
I would like to be able to send alarms to someone else	<input type="checkbox"/>	<input type="checkbox"/>
I would like something with predictive alarms	<input type="checkbox"/>	<input type="checkbox"/>

6 Continuous glucose monitors (CGM)

In addition to a meter everyone can choose a CGM to measure glucose.

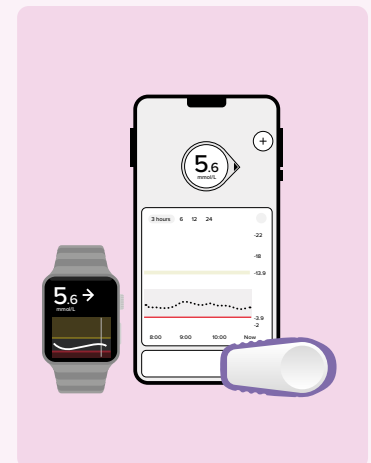
These are sometimes called rtCGM which stands for 'real time continuous glucose monitor'.

How do they work?

- You wear a sensor all the time on your body (arm or abdomen (tummy) depending on the brand).
- A very small filament in the sensor sits just under your skin.
- The sensor measures glucose in interstitial fluid. This is the fluid between cells (not the blood).
- The sensor records your glucose all the time.
- You can see glucose readings on a compatible smartphone or reader at any time.
- You or your carer will change the sensor every 7 – 14 days depending on the brand. You do not need to visit your doctor .

Good to know

- The glucose reading on a CGM will be about 2 minutes behind any finger prick meter reading you do at the same time.
- Glucose measurements from the body, blood from your finger (meter reading) or blood can vary because they are taken from different places. How big this difference is can depend on how fast your glucose is changing. If things are moving quickly, you might feel the difference before you see it. This difference does not usually cause problems in the long run.
- You can see patterns of your glucose levels over time. They show if you are going towards high or low glucose, helping you keep glucose levels in target range.
- Not all brands of CGM are compatible with all smart phones or other devices. Check with your team whether your phone will work with the CGM you choose. Some CGM have reader devices and you do not need a smart phone.
- Each brand is slightly different and can work slightly differently for each person. If you find that one brand is not very accurate for you, try a different brand. It might work better for you.



How do you feel about these options?

I have tried

I would like to try

Device name or type _____

7 Choosing how to measure glucose

How you choose to measure your glucose is up to you

This is a list of NHS authorised meters. Which you will be offered depends what is available in your area.

GlucoFix Tech GK

4SURE Smart Duo

GlucoRX HCT

CareSense Dual

KEYA Smart

Things to think about when choosing a CGM

Put an 'X' where it applies to you

I disagree ← | → I agree

I want it to sound an alarm **if I am** high (hyper) or low (hypo)

--	--

I want it to sound an alarm **if I'm about to be** high or low glucose (warning)

--	--

I want a device that can send an alarm or data to someone else

--	--

I want a device that has a vibrating feature / alarm

--	--

I want a device that can connect to an app

--	--

I want a device that can be connected to a smart insulin pen

--	--

The model / operating system of my watch / phone is:

.....

How accurate is it (see chart on page 15)?

.....

How long does it take for the device to warm up?

.....

8 About insulin and insulin pens

There are different types of insulin

Speed and action of insulin:

- rapid and ultra rapid acting
- short acting
- intermediate
- long acting
- mixed (rapid or short with intermediate acting)

Usually you take **long acting insulin** once or twice a day. This is called **basal** or background insulin.

You take **rapid acting insulin (bolus)** a short time before each meal and to correct high glucose readings.

Concentration of insulin

Most insulins are in a concentration of 100 units per ml.

There are also higher concentration insulins including 200 and 300 units per ml.

Your diabetes team will explain which insulin is best suited to you.

What are insulin pens?

An insulin pen is a device that gives an insulin injection. Some insulin pens are prefilled and disposable, others are re-usable with replaceable insulin cartridges.

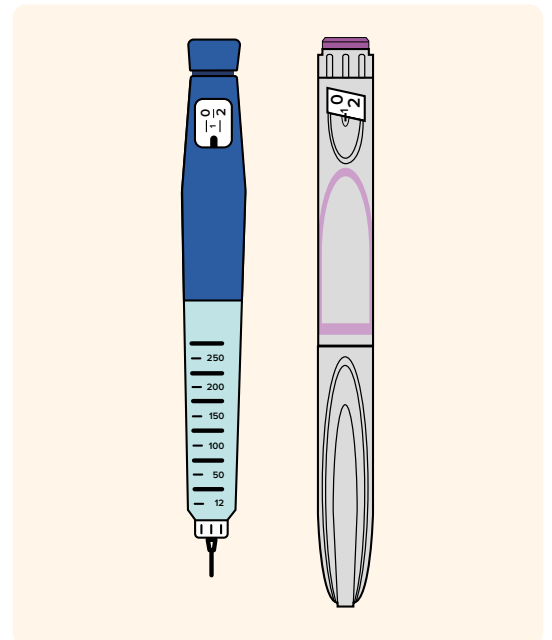
What are connected or 'smart' pens?

Smart pens or connected pens can record the time, date and amount of insulin taken. This can help you and your diabetes team make better treatment decisions.

Smart pens may use cartridges or clip on to your existing insulin pen.

Data can be sent to an app on your phone.

Each pen works with different software and devices (check whether it will work with your phone or software).



Space for notes,
e.g. which brands
fit my answers?

9 Choosing an insulin pen

Answering these questions may help you choose an insulin pen. See page 16 for examples of pens.

How does it work, how easy is it to operate?

.....

How do you adjust the dose?

.....

How finely tuned can the pen deliver doses?

.....

Can it deliver half units?

.....

How many units can the pen hold when full?

.....

How does the pen tell you how much insulin is left?

.....

How big are the numbers on the pen (can I read them)?

.....

How large a dose can be injected?

.....

What is the minimum dose that can be injected?

.....

What types of insulin are available for the pen?

.....

How does it feel when it injects (some pens feel easier and smoother)?

.....

Do I want a disposable pen that I throw away when it is empty?

.....

Do I want a pen that uses cartridges and I can use again?

.....

10 About insulin pumps

You are eligible for an insulin pump if you:

are **under 18 years old**

or

have **HbA1c over 7.5% (58mmol/l)**

or

are **having disabling hypos** (repeated and unpredictable hypos that are making you anxious – see 1.1 on this link to know if this is you. www.nice.org.uk/guidance/ta151/chapter/1-Guidance)

or

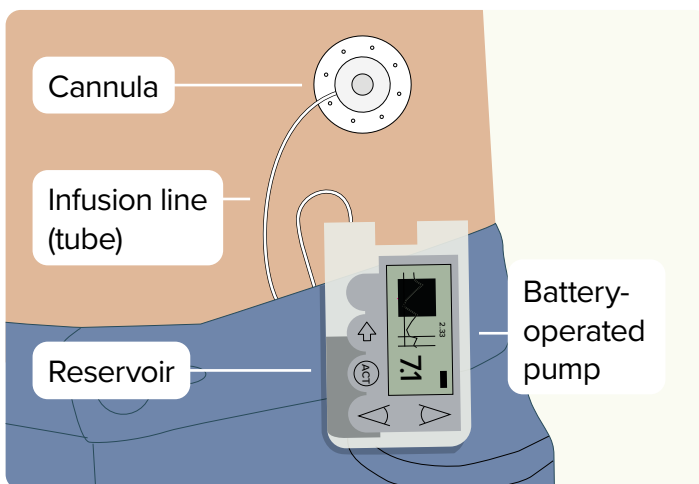
are **trying to get pregnant**

What are insulin pumps?

- They are devices that release pre-programmed amounts of rapid acting insulin.
- They do this regularly through the day and night. This acts like basal or background insulin.
- You can change the delivery of insulin according to any activity or carb or fat content of your food.
- **You wear the pump all the time.**
- **You don't need to inject insulin with a pen device unless the pump fails.**

With a pump you still need to:

- tell the pump to give you a bolus dose before food
- count carbs (estimate carbohydrate content and tell your pump before you eat)
- check your glucose at least 8 times a day
- know your insulin:carb ratios
- know your insulin sensitivity or correction factor



Cannula or needle is how insulin goes into the body. It is usually changed every 3 days or so

Infusion site is where the cannula or needle goes through the skin.

The infusion site can be on your stomach, thigh, arm, back or buttock.

Tethered or untethered

Pumps either connect to the cannula or needle with a tube (tethered) or without a tube (patch pump or untethered).

Where can I wear the pump?

A tethered pump can usually be worn on your waistband, or in a pouch on your waist or thigh.

- You will have regular training in how to use the device from your diabetes team.
- You will have regular meetings with your team. How often will vary from team to team.
- There are many different brands and models of pump each with different features. The next page can help you choose.
- If it is compatible, you might be able to connect a pump to a CGM to create a hybrid closed loop system (page **12**).

If you have tried a pump and are having problems, talk to your specialist team. There might be further training, tips, or an alternative that will work better for you.

11 Choosing an insulin pump

There are different kinds of pump available. Your diabetes team can explain which devices or systems are available to you based on your answers to the questions here.

Things to think about when choosing a pump

Put an 'X' where it applies to you

	I disagree ←	I agree →
I want a device that I can disconnect and reconnect without having to insert a new cannula (tubed or tethered)		
I want a device that is tubeless (patch pump or untethered)		
I want a device that is waterproof so that I can swim (for 30 minutes) or cope in a sauna session		
I want a device that can send an alarm or data to someone else		
I want to wear my device in my bra / waistband / pocket		
I want a device that can upload data to my healthcare provider (so that they can help if I get into difficulty)		
I want a device that allows me to download my data		
I want a device with an inbuilt bolus calculator		
I want a device that you can plug in to re-charge		
I want a device that uses batteries		
I want accessibility features (buzzes, large screen, vibration)		
I want a pump that can connect to a CGM (hybrid closed loop)		

My phone / tablet / smartwatch / computer model or operating system is:

How big is the pump?

What do the pumps that are available to me look like?

What kind of cannula does it have (for example; size, angle, steel or plastic)

Space for notes, e.g. how do I feel about these options?

12 About hybrid closed loop systems

Some CGM can be linked to some insulin pumps to create a hybrid closed loop system.

What is a hybrid closed loop system?

A hybrid closed loop system is where you have a **CGM** and an **insulin pump** that 'talk to each other' through a **computer program (algorithm)**.

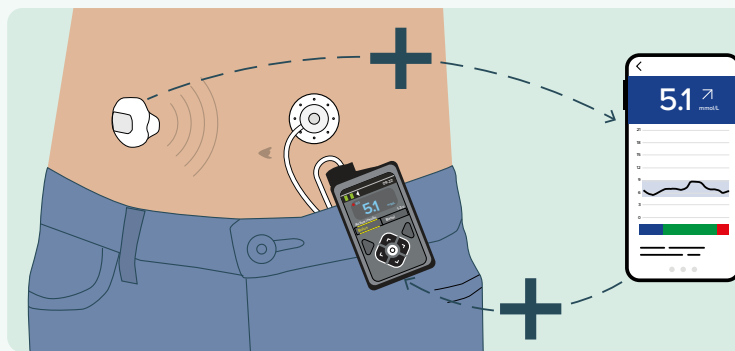
Some of your insulin doses are adjusted automatically in response to your glucose levels.

Glucose is monitored all the time by the CGM.

You still need to tell it when you eat.

They can prevent or minimise hyper and hypo situations.

The algorithm will stop insulin delivery if it thinks you are going below target. This is usually set between 5.5 and 6.1mmol/l.



Computer program / algorithm

A computer program that works out how much insulin you need.

This can be part of the pump itself or a separate 'app' on a device like a mobile phone.

New technology is coming out all that time.

The Diabetes Specialist Nurse Forum UK has up to date information about hybrid closed loop systems currently available.

You can find the latest information on their website:

www.diabetesspecialistnurseforumuk.co.uk/whats-new

Space for notes

13 Preparing for your appointment

Questions for your healthcare professional

For example, are you having trouble staying in range, are there any activities or times of the day you are struggling with?

What are your targets, your goals and time frame for these?

You might want to include a plan to work towards a technology option (if that is not agreed today).

.....

.....

.....

.....

.....

.....

Would you like to be in touch with others to hear about their experience?

Y/N

Contacts

Name of diabetes team:

What are their contact details?

.....

Next steps

My next appointment is with:

.....

When is my next appointment:

.....

Is there anything I need to do now?

.....

Your decision

I know enough about the features of each option Y / N

I am clear about which features matter most to me Y / N

I have enough support and advice to make a choice Y / N

I feel sure about the best choice for me Y / N

I need more information to make this decision Y / N

I have decided what to do next Y / N

.....

14 More information

Where can I go for more information?

For psychological support – www.diabetes.org.uk/guide-to-diabetes/emotions

Diabetes Specialist Nurse Forum UK – has resources for patients and up to date information on new technology www.diabetesspecialistnurseforumuk.co.uk

Association of British Clinical Diabetologists – Diabetes Technology Network – has resources and educational videos by experts <https://abcd.care/dtn>

Twitter – #GBDOC

JDRF – An organisation that funds research into type 1 diabetes and has useful resources for people with diabetes. www.jdrf.org.uk

Diabetes UK – www.diabetes.org.uk

Diabetes UK have a helpline Mon – Fri 9am – 6pm 0345 123 2399

Diabetes UK have online support forums for specific topics for example, the Insulin pumps forum <https://forum.diabetes.org.uk>

Digibete – Website for young people and families – www.digibete.org

Type 1 resource – www.t1resources.co.uk

For information about driving

DVLA INF294 – leaflet about driving with T1DM

For people who do sport or exercise – www.runsweet.com

Approved glucose meter brands – www.england.nhs.uk/wp-content/uploads/2023/04/PRN00037-commissioning-recommendations-blood-glucose-and-ketone-meters-testing-strips-and-lancets-april-2023.pdf

Where did we get our facts from?

Everyone with type 1 diabetes should have access to Flash or CGM –

NICE NG17 www.nice.org.uk/guidance/ng17 and NICE NG18 www.nice.org.uk/guidance/ng18

Who is eligible for a pump? – NICE ta151 www.nice.org.uk/guidance/ta151

How many people in the UK have type 1 diabetes? – A study of 61 million people registered with GPs in the UK from 2020 [https://doi.org/10.1016/S2213-8587\(20\)30272-2](https://doi.org/10.1016/S2213-8587(20)30272-2)

What is NICE?

The National Institute for Health and Care Excellence (NICE) is an independent group who look at all the information available in order to recommend to the NHS and clinicians, which treatments and technology options are most effective and affordable.

To see other decision support tools or to find more information about how this one was created, go to <https://www.england.nhs.uk/personalisedcare/shared-decision-making/decision-support-tools/>

Comparing brands of CGM

For more information visit: www.diabetesspecialistnurseforumuk.co.uk/

Your healthcare provider can go through the different CGM that are available to you. They can explain the different features listed on this page.

Intermittent and real-time continuous glucose monitoring systems comparison chart

	Freestyle Libre 2	Freestyle Libre 3	Dexcom One	Dexcom G6	Dexcom G7	Medtronic G4	GlucoRx AiDEX	Medtrum Touch Care Nano
Real-time CGM	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MARD	9.2	7.8	9.0	9.0	8.2	10.6	9.1	9.1
Published accuracy data	Yes (T1 n=133)	Yes (T1 n=83)	Yes (T1 n=260)	Yes (T1 n=260)	Yes (T1 n=257)	Yes	Yes (T1 n=14)	Yes (T1 n=10)
RCT data	Yes	Yes (FSL/FSL2)	Yes (G4/5/6)	Yes	No	No	No	No
Sensor life	14 days	14 days	10 days	10 days	10 days + 12 hr grace period	7 days	14 days	10-14 days
Sensor warm up time	60 mins	60 mins	120 mins	120 mins	30 mins	120 mins	60 mins	60 mins
Separate transmitter	No	No	Yes	Yes	No	Yes	Yes	Yes
Transmitter Life	N/A	N/A	3 months	3 months	N/A	12 months	4 years	12 months
Smartphone app	LibreLink	Libre 3	Dexcom One	Dexcom G6	Dexcom G7	MiniMed	GlucoRx AiDEX	EasySense
Reader available	Yes	No	Yes	Yes	Yes	No	No	Yes
Capillary glucose calibration	No	No	No	No	No	No	No	No
High & low alarms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Predictive alarms	No	No	No	Yes	Yes	Yes	No	Yes
Stand-alone use	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Pump compatibility	No	YpsoPump	No	Tandem T:slim DANA-i YpsoPump Omnipod 5*	No	Medtronic 780G	No	Touch Care Nano pump
Closed loop compatibility	No	Yes	No	Yes	No	Yes	No	Yes**
Data share HCP	Libreview	Libreview	Clarity	Clarity	Clarity	CareLink	CGM Viewer	EasyView
Data share friends/family app	LibreLinkUp	LibreLinkUp	N/A	Dexcom Follow	Dexcom Follow	CareLink Connect	GlucoRx AiDEX	EasyFollow
UK approved wearable site	Upper arm	Upper arm	Abdomen Upper arm Buttocks +	Abdomen Upper arm Buttocks +	Abdomen Upper arm Buttocks +	Abdomen Upper arm	Abdomen Upper arm	Abdomen Upper arm

= available on prescription (FP10)

+ 2-17 years old , please check manufacturers' guidelines for age specific licences

* Expected mid 2023

**Expected late 2023

Comparing brands of pens

For more information visit: www.diabetesspecialistnurseforumuk.co.uk/

Version 1: May 2023



Prefilled disposable pen device comparison chart

Manufacturer	Insulin	Device name	Min-max dose	Dose increments	Device capacity	Material	Recycle scheme
NovoNordisk	Fiasp	FlexTouch	1-80 units	1 unit	300 units	Plastic	PenCycle (excluding InnoLet)
	Insulatard	Innolet	1-50 units				
	Levemir	FlexPen	1-60 units				
		Innolet	1-50 units				
		FlexPen	1-60 units				
		FlexPen	1-60 units				
		FlexTouch	1-80 units				
		FlexTouch	1-80 units				
		FlexTouch	2-160 units				
		FlexTouch	2-160 units				
Sanofi	Admelog**			1 unit	300 units	Plastic	No
	Apidra	SoloStar	1-80 units				
	Lantus						
	Trurapi**						
		SoloStar	1-80 units				
		DoubleStar	2-160 units				
		KwikPen	1-60 units				
		KwikPen	1-60 units				
		Junior KwikPen	0.5-30 units				
		KwikPen	1-60 units				
Eli Lilly				1 unit	300 units	Plastic	No
Mylan	Semglee**	Pre-filled pen	1-80 units	1 unit	300 units	Plastic	No

** Biosimilar insulins
Information about the PenCycle scheme can be found <https://www.pen-cycle.co.uk>

Comparing brands of pens

For more information visit: www.diabetesspecialistnurseforumuk.co.uk/




Re-usable cartridge pen comparison

Manufacturer	Compatible Insulins (3ml cartridges)	Pen device	Min-Max dosage	Dose increments	Capacity	Colour	Material
NovoNordisk	Fiasp Insulatard Levemir NovoMix 30 NovoRapid Tresiba 100 units/ml	NovoPen 6 Smart pen	1-60 units	1 unit	300 units	Blue Silver	Metal & plastic
		NovoPen 5					
		Novopen Echo Plus Smart Pen	0.5-30 units	0.5 units	300 units	Teal Red	
NovoPen Echo							
Sanofi	Admelog** Apidra Lantus Trurapi**	Allstar PRO	1-80 units	1 unit	300 units	Blue, Silver	Plastic
		Junior STAR	0.5-30 units	0.5 units	300 units	Red Blue Silver	
Eli Lilly	Abasaglar** Humalog 100 units/ml Humalog Mix 25 Humalog Mix 50 Humulin I Humulin M3 Humulin S Lyumjev 100 units/ml	HumaPen Savvio	1-60 units	1 unit	300 units	Blue Graphite Red	Metal
Wockhardt	Porcine Neutral Porcine Isophane Porcine 30/70 Mix	Owen Munford Autopen Classic 1-unit pen	1-21 units	1 unit	300 units	Dark green	Plastic
		Owen Mumford Autopen Classic 2-unit pen	2-42 units	2 units	300 units	Dark blue	

** Biosimilar insulins

All re-usable cartridge pens can be prescribed via FP10, a spare pen device should always be available in case of loss or breakage.

Hybrid Closed Loop (HCL) Systems comparison chart*

	Medtronic	Tandem	Advanced Therapeutics	Ypsomed	Insulet**
 HCL algorithm	SmartGuard	Control IQ	CamAPS FX	mylife Loop (powered by mylife CamAPS FX)	SmartAdjust
Location of algorithm	Pump-integrated	Pump-integrated	App based (Android)	App based (Android)	Pod-integrated
Pump	Medtronic 780g	T-slim X2	DANA-i	mylife Ypsopump	Omnipod 5
Pump type	Tethered (tubed)	Tethered (tubed)	Tethered (tubed)	Tethered (tubed)	Patch (tubeless)
Continuous glucose monitor (CGM)	Guardian 4 (no calibration)	Dexcom G6	Dexcom G6	Dexcom G6, Freestyle Libre 3	Dexcom G6
Control & bolus delivery operation	Pump	Pump	Android smartphone	Android smartphone	Omnipod 5 Controller
Pump charging mechanism	AA battery	Rechargeable	AAA battery	AAA battery	Battery within each pod Controller is rechargeable
Target glucose	5.5, 6.1 or 6.7 mmol/L (default 5.5)	6.25-8.9 mmol/L	Customisable from 4.4 to 11.1 (default 5.8)	Customisable from 4.4 to 11.1 (default 5.8)	6.1, 6.7, 7.2, 7.8, or 8.3 mmol/L
Exercise mode target glucose	8.3 mmols/L	7.8-8.9 mmol/L	No specific target. Ease off mode can be used for exercise	No specific target. Ease off mode can be used for exercise	8.3 mmol/L & delivery of less insulin
Sleep mode target glucose	No	6.25-6.7 mmols/L	Customisable glucose target can be adjusted overnight	Customisable glucose target can be adjusted overnight	Customisable glucose target or exercise feature (see above)
Bolus calculator based on	CGM value, glucose trend data and bolus calculator settings	CGM value only with bolus calculator settings	CGM value only with bolus calculator settings	CGM value only with bolus calculator settings	CGM value, glucose trend data and bolus calculator settings
Automated correction bolus settings	If predictive glucose > 6.7 mmols/L and if max basal rate is reached	If predicted glucose in 30 mins >10 mmols/L & increasing/max delivery is reached	Incorporated into continuous insulin delivery. Adjusts insulin delivery every 8-12 minutes	Incorporated into continuous insulin delivery. Adjusts insulin delivery every 8-12 minutes	Automated micro-boluses every 5 mins. Plus user initiated correction bolus
Active insulin time	Adjustable	Not adjustable (set at 5 hrs)	Adjustable	Adjustable	Adjustable
Set up requirements	Basal rates, ICR, ISF & active insulin time	TDD, body weight, basal rates, ICR & ISF	TDD & body weight	TDD & body weight	Basal rates, ICR, ISF & active insulin time
Learning mechanisms	Uses TDD over past 2-6 days. Requires 48 hours of manual mode to learn user profile	Uses body weight & TDD. Predicts glucose 30 mins ahead	Overall insulin needs, diurnal, post meal.	Overall insulin needs, diurnal, post meal	Adapts with each pod using previous TDDs. Predicts glucose 60 mins ahead
Remote monitoring for parents/carers	Glucose and insulin data via CareLink Connect app	Glucose data via Dexcom follow app.	Glucose data via Dexcom follow app	Glucose and insulin data via 'companion' in mylife CamAPS FX app	Glucose data via Dexcom Follow app
Data share with HCPs	CareLink (via app in real-time)	Glooko (download needed)	Glooko (real-time)	Glooko (real-time)	Glooko (real-time)
Minimum and maximum daily dose	8-250 units per day	10-100 units per day	5-350 units	5-350 units	Min 5 units per day Min 85 units to activate pod
Pump capacity	300 units	300 units	300 units	160 units	200 units
Insulin compatibility	NovoRapid & Humalog	NovoRapid & Humalog	Any rapid and ultra rapid acting	NovoRapid, Humalog, Fiasp, Apidra & Lyumjev	NovoRapid, Humalog & Admelog
Licensed in pregnancy	No	No	Yes	Yes	No
Age Range	7-80 years	6 years & over	1 years & over	1 years & over	2 years & over
Demo pump app/simulator	Yes	Yes	?	Yes	Yes

ICR – insulin carbohydrate ratio

TDD – total daily dose of insulin

ISF – insulin sensitivity factor

Adapted for health care professionals from Tim Street's Hybrid closed loop systems: Veision 2.0 April 2023

*Availability of systems will be dependent on agreement with NHS England work, led by Prof Partha Kar

**expected mid 2023

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To hear more about brands of pumps, ABCD have produced a video. You can find it here:
<https://abcd.care/resource/insulin-pump-therapy-choices>