

Nottingham and Nottinghamshire ICB Adults Blood Glucose & Ketone Meter Formulary

Self-Monitoring Blood Glucose (SMBG) Criteria

All adult patients with Type 1 Diabetes Mellitus (T1DM) should be offered SMBG (if Continuous Glucose Monitoring (CGM) is not suitable) and patients should be encouraged to measure at least 4 times a day, and up to 10 times a day in certain circumstances.

Offer SMBG for adults with Type 2 Diabetes Mellitus (T2DM) only if:

- the person is on insulin OR
- there is evidence of hypoglycaemic episodes OR
- the person is on oral medication that may increase their risk of hypoglycaemia while driving or operating machinery OR
- the person is pregnant or is planning to become pregnant.
- Consider short term SMBG if starting treatment with oral or IV corticosteroids or to confirm suspected hypoglycaemia e.g., at acute intercurrent illnesses.

It is essential to ensure that the patient or carer is provided with training on how to interpret the readings and what action to take (if any).

Blood Glucose Meter Choice

All meters listed on page 3 using test strips costing less than £6.00 per box of 50 listed in the [Drug Tariff](#) can be offered to patients. However, test strips costing between £6 and £8 are also appropriate where there is a specific clinical need or patient requirement, as long as they meet the criteria listed in page 4.

It is recommended that the meter with the most cost-effective test strips is selected at the first opportunity.

The test strips below are the current preferred choices for patients with T2DM across Nottingham and Nottinghamshire. The list below will allow patient specific choice to select a cost-effective meter that is most appropriate to their personal circumstances. The list is also compliant with the standards expected in Nottinghamshire for SMBG meters (criteria listed on page 4).

It is strongly recommended that patients are only switched to a new meter during a face-to-face consultation. We recommend you inform the patient prior to changing the meter to give them an opportunity to raise any concerns. Current strips should be used up first to avoid waste. Consider stopping SMBG management in patients who are on diet-controlled treatment or not meeting the criteria for initiating SMBG.

Newly diagnosed patients with diabetes should only be offered self-monitoring blood glucose equipment once they have been assessed by a healthcare professional. The healthcare professional must be confident that the patients meet the testing criteria or make a suitable clinical decision that SMBG would improve the patient's prognosis. Patients who meet the NHSE criteria for CGM and are prescribed CGM meters should only require one box of test strips every three months. The BGTS should either not be placed on their repeat or added on to the repeat with quantity restrictions to prevent inappropriate ordering from patients and third parties to help with minimising wastage. Freestyle Optium test strips are not recommended for prescribing as other cost-effective strips are available.

T2DM patients outside the SMBG criteria and patients wanting strips outside the formulary with no clinical benefit are able to buy test strips without a prescription, and practices may want to advise patients to do this if there is no **clinical** reason for the patient to monitor their blood glucose and they choose to do this themselves,

however, the overall health needs of the patient must be considered and the impact of this course of action on the patient's long term diabetes management.

General Notes for Self-Monitoring Blood Glucose monitoring and equipment

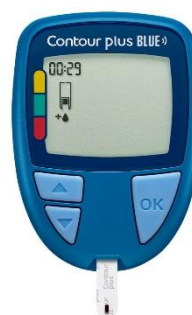
- Capillary blood glucose monitoring should not be used for patients who are severely hypotensive/patients in shock/patients who are severely dehydrated – laboratory blood glucose is necessary.
- Some test strips may not be suitable for patients with low (<20%) or high haematocrit levels (>60%) – each meter has its own haematocrit range (see manufacturers data) as may give inaccurate results.
- Glucose oxidase can be affected by oxygen and can lead to inaccurate results for patients undergoing oxygen therapy – check manufacturers data.
- Keep all test strips in their original containers.
- Do not use test strips after the expiry date/ be aware of the in-use expiry date of test strips.
- Keep test strips in a cool dry place away from humidity and direct sunlight.
- All healthcare professionals should be aware that different meters have variability in device accuracy and durability. If a patient reports a problem with their meter, it is appropriate to issue a new or replacement device. Where possible, use this as an opportunity for your team to provide a more cost-effective meter.
- Quality control (QC) solution must be obtained from the meter manufacturer – cannot prescribe on FP10.
- Once opened the QC solution only lasts for 90 days (or until expiry date if less than 90 days from opening).
- The accuracy of blood glucose meters should be checked regularly and on the following occasions: every time a new pot of 50 test strips is opened, when a meter has been dropped, is damp or wet or when you suspect the meter is producing unexpected results.
- Strong electromagnetic radiation may interfere with the proper operation of blood glucose testing meters.

When or how often should a control solution test be performed?

- First receiving or purchasing the meter.
- Checking the meter and test strips (which should be done at least once a week).
- Using a new vial of test strips.
- You suspect the meter or test strips are not working properly.
- Your blood glucose test results are not consistent with your expectation, or you think the results are not accurate.
- Practicing the testing process.
- The meter has been dropped or damaged.

Your patients can order control solutions directly from the blood glucose meter manufacturer.

Nottingham and Nottinghamshire ICB T2DM Blood Glucose Test Meters Formulary



Name of meter	GLUCORX Q	FINETEST LITE	CONTOUR PLUS BLUE	PALMDOC 2	ACCU-CHEK INSTANT
Test strips	GlucorX Q	Finetest Lite	Contour Plus	Palmdoc (NOT iCare)	Instant
Pip Code	349-1347	399-4027	409-9776	339-0843	417-0759
Cost (50 test strips)	£5.45	£5.35	£5.95	£5.90	£5.95
In use strip expiry	6 months	6 months	24 months	6 months	21 months
Memory	450	500	800	900	720
Enzyme technology	GOD Enzyme technology	GDH-FAD	GDH-FAD	GDH-FAD	GDH-FAD
UK Distributor	GlucorX Ltd	Neon Diagnostics	Ascensia	Palmdoc	Roche Diabetes Care
Helpline Number	01483 755133	0800 131 3378	0345 600 6030	0800 994 9995	0800 701000
Recommended Lancets	GlucorX lancets (30G)	Microdot Plus 33g, 30g	Microdot Plus 33g, 30g	Microdot Plus 33g, 30g	Fastclix lancets
Pip Code	(200) 349 -1354	33G (100) 4054979 30G (100) 4054961	33G (100) 4054979 30G (100) 4054961	33G (100) 4054979 30G (100) 4054961	(204) 351-2795
Volume of blood required	0.7 microlitre	0.5 microlitre	0.6 microlitre	0.7 microlitre	0.6 microlitre
Haematocrit range	30 – 55%	20 - 65%	0% - 70%	20-60%	10 – 65%
Special Features	Compatible with Glooko™ app	Finetest smart meter available: Bluetooth functionality Compatible with Glooko™ app	Second-Chance™ sampling. Bluetooth pairing to the CONTOUR®DIABETES app. Compatible with Glooko™ app	English / Bengali / Polish / Urdu and Arabic.	Bluetooth functionality https://support.rochediabetes.com/careplatform/en

Patient groups requiring additional functionality:

Patient group	Reason for exclusion or special consideration	
Existing diabetes and pregnant or gestational diabetes	NUH Patients require a meter that is compatible with the GDM-Health™ app Wavesense Jazz Wireless , using Wavesense Jazz strips	SFHT Patients require a meter that is compatible with the Glooko™ app. e.g. 4SURE Smart , using 4SURE strips
Requires the facility to test for ketones: T1DM, all patients using Continuous Glucose Monitoring (CGM). Other groups as recommended by the specialist.	Meters which measure ketones: GlucoRx HCT , Glucifix Tech GK Caresens Dual , 4SUREsmart Duo . See table below for compatible strips	
Registered blind or partially sighted	Will require meters with large displays or voice guidance. Meters with voice guidance include: CareSens N voice , GlucoRx Nex-us voice .	
Remotely managed by telehealth which links to their meter	Meter of choice will vary within this group. Telehealth per se is not a reason. The exclusion is only valid if the telehealth and the meter are linked.	
Any patient for whom the GP considers it appropriate for the patient to remain on a specific meter (document in notes)	Meter in use will vary due to individual circumstances. The reason must be documented in the notes. An example would be a diabetic who is classed as hypoglycaemic unaware.	
Patients with needle phobia, paediatrics, visual impairment, manual dexterity, occupational (Group 2 drivers HGV, working in dirty environments) or high frequency testing (>5 a day).	Contour Plus Blue or Mylife Unio may be considered for people living with T2DM who have special circumstances affecting their ability to use individual test strips and lancets where regular testing is required.	
Child/adolescent aged less than 18 years	Recommend getting agreement with relevant specialist on an individual basis (many in this group are likely to be excluded due to meeting other criteria specified in this table).	
Patients on dialysis	May be using specific meters which provide dosing advice on insulin requirements. Obtain specialist advice.	





Criteria for including Self-Monitoring Blood Glucose Meters on Joint Formulary

Criteria	Rationale
Compliance with section 6.3 of ISO 15197: 2013	The 2013 standards are more stringent than the previous 2003 standards. There is a transition period of 3 years by which time strips/meters must be compliant with this standard. By including only those which are compliant now will reduce the risk that patients will need to be switched again when the non-compliant product is discontinued.
Memory capacity of 450+ tests	Would allow 5 tests to be carried out per day for 3 months. (DVLA stipulates that group 2 drivers i.e. lorries or buses on insulin must provide 3 months of continuous blood glucose records at their annual examination by an independent consultant diabetologist). If a patient is testing at mealtimes and/or insulin dose and before they drive, then they could reasonably need to test five times per day.
Memory can NOT be easily deleted	DVLA stipulates that group 2 drivers i.e. lorries or buses on insulin must provide 3 months of continuous blood glucose records at their annual examination by an independent consultant diabetologist.
Results can be downloaded	Most meters have the facility to download blood glucose readings to the patient's own PC and many companies provide software to enable patient information to be presented in a variety of ways. This can facilitate sharing between the patient and healthcare practitioner.
Calibration NOT required	Frequent need to re-calibrate equipment is a clear disadvantage which can compromise ease of use.
Results: mmol/l	It is standard practice in the UK for all blood glucose meters to report results in terms of mmol/l however across Europe some countries report as mmol/dl. It is therefore important for patient safety that the UK standard is the only option.

Nottingham and Nottinghamshire ICB Adults blood glucose and ketone test meter recommendations

Some patients may need to test their ketones e.g T1DM, patients at risk of DKA or previous ketones in blood. These patients should be given Ketone meters along with education on action to be taken. It is recommended where possible that a separate cost-effective ketone meter is provided in addition to a cost-effective blood glucose meter recommended on page 3. Consider prescribing ketone testing strips which cost less than £10 per 10 strips as per below:

Real time and intermittent continuous glucose monitoring (Freestyle Libre) are only available for patients who meet [NottsAPC](#) criteria; the associated glucose and ketone strips (FreeStyle Optium) are expensive and are not recommended as they offer no clinical or technological advantage. Patients using Freestyle Libre® or other brands of CGM should have access to one of the recommended meters or self-fund the compatible strips.

				
Name of meter	GLUCOFIX TECH GK	GLUCORX HCT & KETONE	CARESENS DUAL	4Sure Smart Duo
Glucose Test Strips	Glucifix Tech Sensor Strips	Glucorx HCT	CareSens PRO	4Sure Test Strips
Cost (50 test strips)	£5.95	£8.95	£9.95	£7.99
Ketone Test Strips	Glucifix Tech Ketone Sensors	Glucorx HCT Ketone Test Strips	KetoSens Ketone Test Strips	4Sure β-Ketone Test Strips
Cost (10 test strips)	£9.95	£9.95	£9.95	£9.92
In use strip expiry	6 months	6 months	12 months	24 months
Memory	730 results + 100 ketones	1000	1000	1000 results
UK Distributor	A Menarini Diagnostics	Glucorx Ltd	Spirit Healthcare	Nipro-group
Helpline Number	0800 243667	01483 755133	0800 8815423	0800085 8808
Recommended Lancets	Microdot Plus 33g, 30g	Glucorx lancets (30G)	Microdot Plus 33g, 30g	Microdot Plus 33g, 30g
Volume of blood required	0.5 microlitre (Glucose) 0.8 microlitre (Ketone)	1 microlitre (Glucose)	0.4 microlitre (Glucose) 0.5 microlitre (Ketone)	0.5 microlitre (Glucose) 0.8 microlitre (Ketone)
Glucose Haematocrit range	10-70% (Glucose) 20-60% (Ketone)	0-70%	15-65% (Glucose) 30-60% (Ketone)	0-70% (Glucose) 10-70% (Ketone)
Special Features	QuickLink NFC, Bluetooth and dedicated USB cable, GlucoLog Lite, GlucoLog Web & RapidCalc Bolus Advice App, Glooko and Diasend	Bluetooth, suitable for use in new-borns, during pregnancy and by patients on dialysis, Compatible with Diasend and Glucorx Voyager	Bluetooth, Compatible with SmartLog software and Diasend Uploader,	Bluetooth, Compatible with Diabetes M (bolus advisor) / Diasend uploader / Glooko

Lancets Formulary

Where possible it is recommended to prescribe cost-effective lancets priced less than £2.35 per 100. All lancets costing less than £2.35 per 100 listed in the [Drug Tariff](#) can be offered to patients.

Lancing or finger pricking devices cannot be prescribed on the NHS using FP10 prescriptions. A lancing device is usually provided with the blood glucose meter. However, the lancing device does not need to be the same brand as the blood glucose meter. Alternative lancing devices which use more cost-effective lancets can be obtained from relevant manufacturer free of charge. Most single use lancets can fit several devices, so a new lancing device is not always required when switching to a more cost-effective lancet choice.

Children or patients with dexterity issues may need to try different lancet devices to determine which one is easier to use for them. Patient with dexterity problems, needle phobia or visual impairment may benefit from multi-device lancets like Fastclix.

General notes for Lancing devices and lancets

- The higher the gauge of the lancet, the smaller the diameter of the needle.
- Lancets of 0.28mm to 0.38mm costing less than £2.35 per 100 are suitable for most patients. If patient complains of pain a higher gauge, 33g should be recommended.
- Ensure the prescribed quantities are in line with the frequency of testing.

Lancets	Cost per 100 lancets (Nov 24 Drug Tariff Price)	Pack Size
Droplet 0.2mm/33g, 0.31mm/30g, 0.36mm/28g	£2.19	100
Microdot Plus Lancets 0.20mm/33g or 0.30mm/30g*	£2.19	100
Palmdoc iCare Advanced 0.38mm/30g	£2.22	200
Glucorx Lancets 0.31mm/30g	£2.25	200
Apollo Twist 0.36mm/28g Lancets	£1.80	200
Glucosen Lancets 0.36mm/28g	£2.50	200
AgaMatrix Ultra-Thin Lancets 0.35mm/28g and 0.20mm/33g	£2.72	200
Glucogest Lancets Plus 0.20mm/33g	£2.75	200
Mylife Lancets 0.3mm/30g	£2.75	200
On Call Lancets 0.3mm/30g or 0.46mm/26g	£2.75	100
Milward Steri-Let 0.66mm/23g or 0.36mm/28g	£2.85	200
Palmdoc lancets 0.38mm/30g	£2.85	100
FastClix	£2.89	204
4SURE Lancets 0.32/30g and 0.195/33g	£2.90	100
TRUEplus Lancets	£2.90	100
OneTouch Delica Plus 0.32mm/30g	£2.92	200
Advocate 0.31/30g	£2.95	100
CareSens 0.31/30g or 0.36/28g	£2.95	100

*Microdot® Plus lancets are compatible with most lancing devices, however GPs wishing to prescribe the Microdot® Plus lancets can be supplied with compatible lancing devices from Cambridge Sensors Limited (Microdot) to distribute to patients to ensure full compatibility. Please contact their Customer Helpline (0800 088 3920) for further information.

Insulin Pen Needles Formulary

Disposable pen needles are required with insulin pens and most glucagon like peptide-1 (GLP-1) analogue pens. Pen needles generally fit most insulin and GLP-1 pen brands. Pen needles come in two types: screw fittings and “click or twist” (patient specific: audible reasons).

There are many different types of insulin pen needles available at a varying cost from £2.49 to £30.08. Rationalising use ensures that the most cost-effective options are used first line. *NHSE items which should not be routinely prescribed in primary care* advised CCGs that prescribers should not initiate pen needles that cost > £5 per 100 and consider finding an alternative for existing patients on needles > £5 per 100.

Where possible it is recommended to prescribe cost-effective needles priced less than £3 per 100. All needles costing less than £3.00 per 100 listed in the [Drug Tariff](#) can be offered to patients.

The recommended brands are as follows:

Needles	Size of Needle	Cost per 100 (Sept 22 Drug Tariff Price)
Insupen Original	4mm/32g 4mm/33g 5mm/31g 6mm/31g 6mm/32g	£2.49
GlucorX CarePoint	4mm/31g 5mm/31g 6mm/31g	£2.75
GlucorX CarePoint Ultra	4mm/32g	
Greenfine	4mm/32g 5mm/31g 6mm/31g	£2.75

Average skin thickness ranges from 1.9-2.4mm in adults living with diabetes regardless of age, gender, ethnicity, or BMI. Benefits of shorter pen needles were reviewed (less risk of IM injection, no need for a lifted skin fold, more comfortable to inject). FIT UK Recommendation: 4, 5 and 6mm pen needles are suitable for all adults living with diabetes regardless of BMI. For more information, please refer to the following document: <https://fit4diabetes.com/wp-content/uploads/2023/08/FIT-Needle-Length-2020.pdf>