

## **Guidelines for approved choice of Blood Glucose Testing Strips, Meters and Lancets. Also includes guidance for self-monitoring of blood sugars and ketones**

The cornerstone of good glycaemic care is the quality of support and educational relationship between the healthcare professional and the patient. A patient who doesn't understand why and when they should undertake blood glucose testing, will either test too frequently or fail to test when needed. A patient-centred approach is encouraged, explaining the rationale for testing in different situations, whenever an opportunity presents.

NICE recommends that patients who self-monitor their blood glucose are given a structured assessment, at least annually, which includes an assessment of a patient's self-monitoring skills, the frequency and quality of testing, a knowledge of how to interpret blood glucose results and what action to take, the impact on a patient's quality of life, the equipment used and evidence that self-monitoring continues to provide benefit to the patient. A Cochrane review demonstrated that SBGM reduced HBA1c by approximately 3mmol/mol in non-insulin treated type 2 diabetics at up to six months; thereafter, reduction was not statistically significant. <https://www.prescqipp.info/media/1129/b46-bgts-211.pdf><sup>1</sup>

**Healthcare professionals should only provide a meter to a patient if it is appropriate for them to monitor their blood glucose level. Meters will be provided free of charge from GP surgeries or diabetic clinics. It is the responsibility of the clinician providing the meter to provide guidance on appropriate testing and training and support on the use of meter itself.**

There should be no need for a patient to purchase a meter and patients should be dissuaded from doing so without consulting their specialist first. Prescribing of strips and lancets for patients who purchase a meter is not supported by the Area Prescribing Committee.

### **Patients who should be testing**

- People with type 1 diabetes
- Women who develop diabetes in pregnancy
- People with type 2 diabetes treated with medication which carries a risk of inducing hypoglycaemia – insulin, sulfonylureas and glinides.
- In addition, short term testing may be required to confirm suspected hypoglycaemia in type 2 diabetics, or if these patients are commenced on oral or intravenous corticosteroids.

### **Choice of meter and test strips**

Meters have been identified as providing the necessary required functions, level of accuracy and have Diabetes Specialist Nurse endorsement in relation to use, availability of training and support. Meters were required to:

- have a small sample size (less than one microlitre),
- be suitable for patients on dialysis,

- meet DVLA criteria - having a memory function which records three months of blood glucose readings with no delete facility.
- require no coding
- not accept expired strips
- have evidence of meeting the International Organisation for Standardisation (ISO) performance standard for blood glucose monitoring systems for self-testing in managing diabetes mellitus (ISO 15197-2013.)

In addition those meters intended for use in non-complex patients, are expected to have test strips available at a Drug Tariff cost of less than £8 for 50 strips. Other reasons for excluding meters were acceptance of date expired testing strips and experience of patients being transferred to an “upgraded” meter on contact with company’s customer services.

### **Approved List of Blood Glucose Testing Meters and Lancets**

Prices from Drug Tariff April 2022<sup>2</sup> Please note that the tables give an indication of which lancets would be supplied with the original meter. However, any lancet may be used with these meters once the original supply has been exhausted. Choice of lancets should be based on patient preference, lancet length and thickness, availability and cost effectiveness.

This article highlights cost effective lancets: <https://www.prescgipp.info/umbraco/surface/authorisedmediasurface/index?url=%2fmedia%2f5247%2f276-lancets-for-self-use-20.pdf>

**First line preferred lancet** - GlucoRx lancets £4.50/200 lancets - **each box of lancets has a lancing device in it** so there are no issues with compatibility.



#### **Other lancets:**



Droplet 0.2mm/33G, 0.31mm/30G, 0.36mm/28G - £2.19/100 lancets – compatible with both Glucoject dual plus lancing device (supplied with GlucoFix tech GK meter) and Microlet next lancing device (supplied with Contour Plus Blue lancing device) when checked in Apr 22. [Droplet lancet compatibility](#)

## Type 1 and Type 2 diabetes stable on insulin therapy or on sulfonylureas or glinides

Please note – Patients may have been supplied with a different meter from the paediatric team/specialist team e.g. Mylife aveo (in the bolus calculator section), this machine should be continued and not switched to a first line formulary option without querying with relevant team first.

**GlucoFix Tech has been replaced by GlucoFix Tech GK which accepts both glucose and ketone strips. Both meters use the same glucose strips so patients on the GlucoFix tech can remain on this if they are just measuring blood glucose until they need a replacement meter**

Meter		Strips	Cost (pack of 50)	Strips expiry after opening	Memory	Key points	Lancets supplied with meter	Cost (pack size)
Glucofix Tech GK (accepts Glucose and Ketone strips – see below)		GlucoFix tech sensor	£5.95	12 months	740 results	<ul style="list-style-type: none"> <li>No coding required</li> <li>NFC connectivity – contactless download to free glucoLog lite app</li> <li>Larger strip size</li> <li>Strip ejector</li> <li>Compatible with Diasend</li> </ul>	Glucoject lancets plus.  <b>Supply ongoing lancets from 1<sup>st</sup> line options above - GlucoRx</b>	£3.77 for 100  £5.50 for 200
Contour Plus Blue		Contour plus testing strip	£5.95	24 months	800 results	<ul style="list-style-type: none"> <li>Second chance sampling</li> <li>Long strip expiry</li> <li>Smartcolour indicator range for results</li> <li>Wide haematocrit range</li> <li>Connects to Contour Diabetes App, data automatically syncs to app</li> <li>Compatible with Diasend</li> </ul>	Microlet lancets  <b>Supply ongoing lancets from 1<sup>st</sup> line options above- GlucoRx</b>	£3.90 for 100

<p>Palmdoc 2</p> <p><b>For patients who require a talking meter</b></p>		Palmdoc	£5.90	6 months (2 x 25 pots)	900 results	<ul style="list-style-type: none"> <li>• Voice function optional – can be turned off</li> <li>• Speaking function in 5 languages – English, Bengali, Urdu, polish, Arabic</li> <li>• Customer support line</li> <li>• Provide support materials in other languages</li> <li>• Compatible with Diasend and GlucoLog Lite App</li> </ul>	Palmdoc lancets- GlucoRx	£2.85 for 100
<p>Accu-chek instant</p> <p>(Reserved for patients who need fastclix lancing device as patients don't see the needles)</p>		Accu-chek instant	£5.95	As printed on box	720 results	<ul style="list-style-type: none"> <li>• Compatible with roche diabetes care platform (RDCP) and Mysugr app</li> <li>• NFC connectivity – contactless uploads to (RDCP) via mysugr app</li> <li>• Color indicator for results</li> <li>• Bolus calculator with mysugar app</li> <li>• Insulin dosing advice</li> <li>• Strip ejector</li> <li>• Mysugr app connects with insulin smartpens</li> <li>• Lancing device is easier to use and can be disposed of in normal waste bin</li> </ul>	Fastclix lancets	£5.90 for 200

Where one meter is required to test both ketones and glucose for clinical and safety reasons

	Meter	Strips	Pack size	Cost	Use with lancet	Pack size	Cost
<p><b>Patient requiring one meter to test glucose and ketones</b></p> <p><b>(If separate meters are required patients should be supplied with a Glucofix Tech GK for ketones)</b></p>	Glucofix Tech GK – 1 <sup>st</sup> line option	Glucofix Tech Sensor (glucose)	50	£5.95	Glucoject plus	200	£5.50
		Glucofix Tech Beta Ketone sensor	10	£9.95	Pick from formulary option above - GlucoRx		
	Freestyle optium neo	Freestyle Optium	50	£16.30	Freestyle	200	£7.64

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and another formulary meter for glucose e.g. contour plus blue)					Pick from formulary option above - GlucoRx		
	FreeStyle Optium $\beta$ Ketone	10	£21.94				

## Specific Patient Cohorts

	Meter		Strips	Pack size	Cost	Use with lancet	Pack size	Cost
<b>Women who develop diabetes in pregnancy</b>	Wavesense Jazz		Wavesense Jazz	50	£8.74	Agamatrix Ultra Thin  Pick from formulary option above - GlucoRx	200	£5.43
<b>Patients who require a talking meter</b>	Palm doc 2 <ul style="list-style-type: none"> <li>Speaking function in 5 languages – English, Bengali, Urdu, polish, Arabic</li> <li>Large screen</li> </ul>		Palmdoc	50 (2 x 25 pots)	£5.90	Palmdoc lancets  Pick from formulary option above - GlucoRx	100	£2.85

\*There have been recent changes at the company, LifeScan, who manufacture and distribute a number of different OneTouch meters and corresponding test strips. This includes the OneTouch Verio IQ meter and OneTouch Verio test strips. LifeScan have suspended mainland UK operations for new customers. This means that they will no longer market meters to new customers on the mainland (available still in the Republic of Ireland and also Northern Ireland).

- The various OneTouch test strips (including OneTouch Verio) remain on the tariff and will be available for several years at least.
- All OneTouch test strips which are currently available on the NHS will remain in the drug tariff and can be issued on prescription in the usual way.
- New patients should not be started on a OneTouch meter but given a different formulary choice.
- Separately, One Touch Verio IQ has been replaced by the One Touch Select meter which is a different meter. OneTouch Verio (not IQ) and OneTouch Select Plus meters remain the same.

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- Patients using the OneTouch Verio IQ meter will be able to order the One Touch Verio test strips as usual. However, when these patients require a new meter, a change will need to be made. It is recommended that patients book in for a review with their practice nurse before their meter is due for an update/replacement to enable a new meter and the accompanying education to be provided as part of a holistic review.

Training and education for the patient must be from the diabetes specialist nursing team	Meter	Strips	Pack size	Cost	Use with lancet	Pack size	Cost
Blood Ketone Meter	Glucifix Tech GK – 1 <sup>st</sup> line option	GlucoFix Tech sensor	50	£5.95	Glucoject plus  Pick from formulary option above - GlucoRx	200	£5.50
		GlucoFix Tech beta ketone sensor	10	£9.95			
	Freestyle Optium Neo*	FreeStyle Optium	50	£16.30	Freestyle	200	£7.64
FreeStyle Optium β Ketone		10	£21.94				
Bolus Calculator Meters  (Calculation done via an app)	Aveo – compatible with diasend  (First line for young patients as paediatric team use diasend)	Mylife aveo	50	£6.95	Mylife lancets	200	£5.50
	Accu-chek instant – compatible with						

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	roche diabetes care platform						
Flash Glucose Monitoring	Freestyle Libre 2	Freestyle Libre 2 sensor	1	£35.00	N/A	N/A	N/A
		Freestyle Optium Beta Ketone	10	£21.94			
Continuous Glucose Monitoring	Dexcom	Dexcom G6	Supplied via CCG				
Insulin pump therapy	Roche: Accu-chek Insight/ Combo	Aviva	50	£16.21	Fastclix	200	£5.90
	Omnipod (with Freestyle Lite Meter)	Freestyle Lite	50	£16.23	Freestyle	200	£7.64
	Medtronic MiniMed 640G (using Contour Next Link 2.4 meter)	Contour Next	50	£15.16	Microlet	200	£7.44
	Tandem t:slimx2	No test strips – uses Dexcom G6 continuous glucose monitoring system. Choose a formulary test strip for back up purposes.	N/A	N/A	N/A	N/A	N/A

- \*Glucomen LX Plus and Glucomen LX 2 meters are no longer being manufactured. Patients using these meters will be able to order the Glucomen LX test strips and Glucomen LX Ketone strips as usual. However, when these patients require a new meter, a change will need to be made.
- It is recommended that patients book in for a review with their practice nurse before their meter is due for an update/replacement to enable a new meter and

- the accompanying education to be provided as part of a holistic review.
- Glucomen GM sensors (which fit the non-formulary Glucomen GM meter) have been withdrawn from the Drug Tariff and are no longer available.
- Glucomen Areo and Glucomen Areo 2K meters remain readily available, as do Glucomen Areo Sensors and Glucomen Areo Ketone Sensors.

The following table gives an indication of frequency of testing. In certain circumstances it may be beneficial to test more frequently (e.g. where concurrent illness or medication including chemotherapy or steroids are involved) or less frequently (in stable patients) than recommended.

### Frequency of Blood Glucose Self-monitoring in Type 1 and Type 2 diabetes <sup>3,4,5,6</sup>

<b>Diabetes Type</b>	<b>Testing frequency</b>	<b>Specific Considerations</b>	<b>Approximate number of strips needed (1 box contains 50 strips)</b> <i>NB may increase in certain circumstances</i>
<b>Type 1 Diabetes</b> Adults	<b>At least 4 times a day</b>	Greater risk of hypoglycaemia and hyperglycaemia Including before each meal and before bed. More frequent testing (up to ten times per day) indicated in certain circumstances (e.g. illness, undertaking type 1 education, drivers, before, during or after sport, or where target HBA11c isn't achieved)	3-4 boxes per month
Patients with flash meters	<b>Individual to patient/ Times of hypo</b>	To confirm a hypo <4, or >15. Counselling by diabetes team	1 box when needed
Children and young people	<b>At least five times a day</b>	More often during illness, physical activity or hypoglycaemia	As requested by diabetes team – can need a high number each month
Insulin pump	<b>Minimum 4 (and up to 8) times a day</b>		



<p><b>In pregnancy: patients with type 1 diabetes, type 2 diabetes or gestational diabetes who are on a multiple daily insulin regimen.</b></p>	<p><b>Up to 7 times a day*</b></p>	<p>Including fasting state, pre-prandial, 1 hour postprandial and bedtime blood glucose up to 7 times a day under specialist advice</p>	<p>4-5 boxes per month (re-assess after delivery)</p>
<p><b>In pregnancy: women with type 2 or gestational diabetes who are treated with diet and exercise <u>and/or</u> oral therapy or single-dose intermediate-acting or long-acting insulin</b></p>	<p><b>Up to 3 times per day</b></p>	<p>Including fasting state and 1 hour postprandial blood glucose</p>	<p>2 boxes per month</p>
<p><b>Type 2 Diabetes Multi-injection insulin therapy (more than 2 times per day)</b></p>	<p><b>Up to 4 times a day*</b> (Usually pre-, but sometimes post-prandial)</p>	<p>Greater risk of hypoglycaemia and hyperglycaemia</p>	<p>3-4 boxes per month</p>
<p><b>Type 2 Diabetes</b></p> <p><b>Insulin therapy and oral anti-diabetic agents</b></p> <ul style="list-style-type: none"> <li>• Fasting glucose</li> </ul> <p><b>Plus either</b></p> <ul style="list-style-type: none"> <li>• If on daily insulin and stable</li> </ul> <p><b>Or</b></p> <ul style="list-style-type: none"> <li>• If on twice-daily Insulin</li> </ul> <p><b>Or</b></p> <ul style="list-style-type: none"> <li>• Unstable glycaemic control</li> </ul>	<p><b><i>Frequency may vary for each individual</i></b></p> <p><b>At least once a day</b></p> <p><b>Plus either:</b> Additional once a day (twice in total) <b>Or</b> Additional twice a day (three in total)</p> <p>More frequent testing</p>	<p>Vary testing times to identify hypoglycaemia</p> <p>Vary testing times to include pre-prandial, postprandial and pre-bedtime</p> <p>Vary according to individual need</p>	<p>2 boxes per month</p>
<p><b>Type 2 Diabetes</b></p> <ul style="list-style-type: none"> <li>• <b>Diet and exercise</b></li> <li>• <b>Oral hypoglycaemic (except sulfonylurea or glinide) and/or sc GLP- 1 agonists</b></li> </ul>	<p><b>Not routinely required*</b></p>	<p>HbA1c main outcome measure Testing may be appropriate in certain circumstances (i.e. newly diagnosed), where need and purpose is clear and agreed with patient. This should be supported by educational support. Drivers may also need to test more frequently.</p>	<p>Not for repeat prescribing.</p>

<p><b>Type 2 Diabetes</b></p> <ul style="list-style-type: none"> <li>• <b>Sulfonylurea</b> (alone or in combination with ANY other anti-diabetic agents)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>About 3 times a week for non-driver</b></li> <li>• <b>Before driving</b></li> </ul>	<p>Hypoglycaemia is common so vary testing times during the day to identify hypoglycaemia</p> <p>Drivers may require more frequent testing</p>	<p>Depending on frequency</p>
<p><b>DVLA regulations for drivers on insulin –</b></p> <p><b>Group 1 (car and motorcycle):</b></p> <p><b>Group 2 (Bus and lorry).</b></p>	<ul style="list-style-type: none"> <li>• <b>No more than 2 hours before the start of the journey and every two hours whilst driving.</b></li> <li>• <b>Group 2 – additionally at least twice a day on days when not driving.</b></li> </ul>	<p>Bus or lorry drivers may require more than one meter to ensure that 3 months or readings are available for assessment.</p>	<p>For Group 1 drivers, see individual drug treatment sections, unless the patient regularly drives long distances.</p> <p>For group 2 drivers: document likely frequency of testing and adjust quantities accordingly.</p>
<p><b>DVLA regulations for drivers not on insulin but on medicines which may cause hypoglycaemia:</b></p>	<ul style="list-style-type: none"> <li>• <b>Group 1 (car and motorcycle) – SMBG at times relevant to driving may help detection of hypoglycaemia.</b></li> <li>• <b>Group 2 (lorry and bus) – as for insulin therapy in Group 2 drivers.</b></li> </ul>	<p>Bus or lorry drivers may require more than one meter to ensure that 3 months or readings are available for assessment.</p>	

- This guidance reflects recommended best practice. Concurrent illness or medication (e.g. steroids, chemotherapy) may increase the frequency of testing.
- It may be appropriate to test less frequently in stable patients.
- Blood glucose meters can be supplied by the DSNs or from the practice nurse from the approved list, if appropriate for the patient. After discussion, a letter will be sent to the patient's GP with a suggested testing regime and requirement for testing strips.
- Patients will be encouraged to utilise the relevant meter help line in the event of problems with the meter (errors, battery replacement or requests for quality control solution).
- Continual updating of meters is not encouraged unless there is a problem with the existing meter.

**\*Please refer to the DVLA 'At a glance' guide to the current medical standards of fitness to drive, Chapter 3 Diabetes Mellitus. Available to download [here](#)<sup>7</sup>**

## **Ketone Monitoring – General Advice – Does not replace advice given by specialist team**

- **Counsel patients to check expiry date of strips and ensure they don't use expired strips**
- **Counsel patient to keep strips in stock rather than getting them when needed**

### **Type 1 diabetics**

- All patients with type 1 diabetes should possess a monitor to test for ketone when they are unwell or during periods of hyperglycaemia (See [CKS guidance](#)).
- Ketone monitoring should be taught as part of 'sick day rules' counselling to facilitate self-management

### **Type 2 diabetics**

- Patient identified as high risk of recurrent diabetic ketoacidosis by the diabetes specialist team
- Recurrent DKA may warrant home monitoring
- Follow specialist recommendation for frequency of testing during periods of illness and hyperglycaemia
- Do not issue ketone strips solely for patients prescribed SGLT2 inhibitors. But if they present as unwell they should be managed as per 'sick day guidance' and their ketone levels checked using a practice meter even if their blood glucose is in the normal range.

## Ketone results interpretation

<0.6	Normal reading
0.6 – 1.5	Slightly increased risk of DKA – test again in 1-2 hours
1.6-2.9	Increased risk of DKA – contact GP / diabetes team as soon as possible
3+	Very high risk of DKA – get medical help immediately

Data obtained from <https://www.nhs.uk/conditions/diabetic-ketoacidosis/><sup>8</sup>

Healthcare professionals are urged to move to a consistent approach in providing products from this list. **Patients should not be “switched” without their involvement and discussion. The opportunity to review strips may present at diabetes review, or recall for review before the next prescription is due. Patients should use all their current test strips before starting to use new meters and strips to avoid waste.**

## References

1. PrescQIPP Bulletin, Self monitoring blood glucose, accessed online at: <https://www.prescqipp.info/media/1129/b46-bqts-211.pdf>. Last accessed 27/4/22
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7. DVLA at a glance guide, accessed online at: <https://www.gov.uk/guidance/assessing-fitness-to-drive-a-guide-for-medical-professionals>.
8. NHS ketone Guidance, accessed online at: <https://www.nhs.uk/conditions/diabetic-ketoacidosis/>. Last accessed on 28/4/22

## Development Process

This guidance has been subject to consultation and endorsement by specialists in diabetes and endocrinology in Barnsley and was ratified by the Area Prescribing Committee on 11th May 2022 (minor amendment July 2023).