

South East London Integrated Medicines Optimisation Committee

Self-monitoring of Blood Glucose (finger prick testing) in Adults and Young People.

This guidance does NOT override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

Developed by the South East London Diabetes Medicines Working Group on behalf of the South East London Integrated Medicines Optimisation Committee.

If you have any queries or comments on this guideline please contact: LAMCCG.medicinesoptimisation@nhs.net



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South East London Integrated Medicines Optimisation Committee (SEL IMOC). A partnership between NHS organisations in South East London: South East London Clinical Commissioning Group (covering the boroughs of Bexley/Bromley/Greenwich/Lambeth/Lewisham and Southwark) and GSTFT/KCH /SLaM/ Oxleas NHS Foundation Trusts and Lewisham & Greenwich NHS Trust

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Introduction

Self-Monitoring of Blood Glucose (SMBG) or finger prick testing is an integral part of diabetes management for a number of individuals. SMBG is particularly useful for those on medication that requires dose adjustments (such as insulin), those who have fluctuations in blood glucose levels or those at increased risk of hypoglycaemia either due to medication, co-morbidities or other factors. This guideline aims to provide guidance to support the optimal use of SMBG.

Guidance

- Individuals with diabetes (and/or their carers) should be provided with the knowledge and skills to support them to incorporate SMBG and therapy adjustments into their diabetes care plan in order to attain agreed goals:
 - On initiation all people performing SMBG should receive adequate training, skills and support from appropriately trained and competent healthcare professionals
 - People with T1DM (and/or their carers) should have their skills and knowledge reviewed at least annually
 - People with T2DM (and/or their carers) should have a structured follow-up assessment on SMBG at least annually, which includes:
 - o self-monitoring skills
 - $\circ \quad$ the quality and frequency of testing
 - checking that the individual knows how to interpret the blood glucose results and what action to take
 - the impact on the persons quality of life
 - the continued benefit to the individual
 - o advice on when to seek help or advice
 - the equipment used
 - All people using SMBG should be encouraged to use the minimum number of test strips to help manage diabetes appropriately and advised when to seek help or advice.
- In April 2023, NHS England (NHSE) published recommendations on choice of <u>blood glucose and</u> <u>ketone meters</u>, <u>testing strips and lancets</u>. South East London ICB have developed a 'preferred' choice of meters, test strips and lancets for primary and secondary care in South East London, based on the NHSE recommended list (see page 6)

Individuals using Continuous Glucose Monitoring (CGM):

 Individuals will also need to use SMBG if the CGM device/reader fails, is damaged, is lost or to facilitate glucose testing when use of the CGM device is not appropriate e.g. in line with DVLA requirements. Please refer to <u>South East London guidance</u> for further information

Testing During Ramadan/Fasting:

 Please refer to <u>South East London guidance</u> for further information, for diabetes management and testing during Ramadan/fasting periods

The suggested testing frequency below is only a GUIDE; there may be situations where people may require testing more or less frequently depending on their individual needs and guidance from their specialist team. For example, more frequent testing would be required if hypoglycaemia is a concern or if the individual is experiencing hypoglycaemia.

TYPE 1 DIABETES



Box 1

- SMBG is indicated for all patients with T1DM¹.
- SMBG is an integral part of treatment of T1DM, all adult patients are eligible for continuous glucose monitoring (see <u>CGM T1DM pathway</u>) but will also need to use SMBG if the CGM device/reader fails, is damaged, is lost or to facilitate glucose testing when use of the CGM device is not appropriate. If a person cannot use CGM or does not want it they should be offered SMBG.
- Routine SMBG for adults with T1DM (not using CGM) should be carried out at least four times a day (before each meal and before bed) to help manage diabetes appropriately (control hyperglycaemia and prevent hypoglycaemia). For young people with T1DM (not using CGM) routine SMBG should be undertaken at least 5 times per day.

Box 2

- Support adults with T1DM (not using CGM) to test at least 4 times a day, and up to 10 times a day if any of the following apply¹:
 - the desired target for blood glucose control, measured by HbA1c level is not achieved
 - the frequency of hypoglycaemic episodes increases
 - there is a legal requirement to do so (such as before driving, in line with the Driver and Vehicle Licensing Agency [DVLA] <u>At a glance guide to the current medical standards of fitness</u> to drive)
 - during periods of illness
 - before, during and after sport
 - when planning pregnancy, during pregnancy and while breastfeeding (see the NICE guideline on <u>diabetes in pregnancy</u>)
 - if there is a need to know blood glucose levels more than 4 times a day for other reasons (for example, impaired awareness of hypoglycaemia, high-risk activities)
- Enable additional blood glucose testing (more than 10 times a day) for adults with T1DM if this is necessary because of the patient's lifestyle (for example, driving for a long period of time, undertaking high-risk activity or occupation, travel) or if the patient has impaired awareness of hypoglycaemia

TREATMENT GROUP	RECOMMENDATIONS FOR SMBG REGIMENS	RECOMMENDED TESTING
		FREQUENCY
	 SMBG is recommended for all patients with T1DM 	Usual range:
T1DM	 If patient is using CGM device – see <u>CGM T1DM pathway</u> If patient not using a CGM device testing should be at least 4 times a day in adults, including before each meal and before bed. 	4 – 10 times daily
	 If patient is testing 8 or more times daily, then alternatives testing systems may be appropriate. Some people may need to test ≥ 10 times daily as detailed in Box 2 above - please see 	More frequent testing may be recommended by the specialist team
	 Some people may need to test ≥ 10 times daily as detailed in Box 2 above - please see <u>NICE T1DM (NG17) guidelines</u> for further information 	

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TYPE 2 DIABETES

Box 3



People should be advised when to seek advice. Be aware that there are increased risks of blood glucose variation in some patients and they may require increased testing frequency e.g. during: acute inter-current illness pregnancy/pre-conception any changes in therapy that may alter blood glucose results changes in lifestyle/routine at any times where erratic results may be dangerous e.g. driving to identify possible hypoglycaemia **TREATMENT GROUP RECOMMENDATIONS FOR SMBG REGIMENS** HbA1C provides a reliable and sufficient means of monitoring glycaemic control. Newly diagnosed T2DM + diet controlled Do not routinely offer SMBG for adults with T2DM unless²: the person is on insulin, or Managed by there is evidence of hypoglycaemic episodes, or medication, including the person is on oral medication that may increase their risk of hypoglycaemia while driving/operating machinery (please follow DVLA guidance), or non-insulin injectable the person is pregnant, or is planning to become pregnant, or e.g. Metformin, pioglitazone, the person is starting treatment with oral or intravenous corticosteroids², or DPP4 Inhibitors, GLP-1 to confirm suspected hypoglycaemia Analogues or SGLT-2 Box 3 provides advice on when additional testing may be required. Please see NICE T2DM (NG28) guidelines. for further information. Inhibitors If SMBG is necessary, the healthcare professional should tailor the monitoring regimen to the persons individual circumstances and review regularly e.g. 3 monthly Do not routinely offer SMBG for adults with T2DM unless²: Managed by medication the person is on insulin, or carrying a there is evidence of hypoglycaemic episodes, or hypoglycaemic risk the person is on oral medication that may increase their risk of hypoglycaemia while driving/operating machinery (please follow DVLA guidance), or the person is pregnant, or is planning to become pregnant, or e.g. Insulin secretagogues: the person is starting treatment with oral or intravenous corticosteroids², or sulfonylureas and to confirm suspected hypoglycaemia meglitinides (glinides) Box 3 provides advice on when additional testing may be required. Please see NICE T2DM (NG28) guidelines. for further information. Specialist teams may advise additional testing for individuals with certain co-morbidities including chronic kidney disease, frailty, foot ulceration and those who have had cardiac intervention. Frequency of testing will be advised by the specialist team SMBG should be routinely offered and tailored to the persons individual needs depending on diabetes control and treatment plan: Insulin treated T2DM Insulin regimen Suggested SMBG testing frequency Once daily basal insulin Once a day Twice daily basal insulin Twice a day Basal bolus regimen See Insulin-treated T1DM above TWICE daily mixed insulin Two/Three times a day Box 3 provides advice on when additional testing may be required. Please see NICE T2DM (NG28) guidelines. for further information. Specialist teams may advise additional testing for individuals with certain co-morbidities including chronic kidney disease, frailty, foot ulceration and those who

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PREGNANCY

- Box 4
 All pre-conception and pregnant women with Type 1 diabetes are eligible for CGM (see <u>CGM T1DM pathway</u>) but will also need to use SMBG if the CGM device/reader fails, is damaged, is lost or to facilitate glucose testing when use of the CGM device is not appropriate. If a person cannot use CGM or declines a CGM device they should be offered SMBG.
- All pre-conception and pregnant women with pre-existing Type 2 diabetes or gestational diabetes should be offered SMBG⁴. They may be eligible for CGM (see '<u>SEL Flash Glucose</u> Monitoring guidance'.)
- Women with diabetes are more likely to have adverse outcomes including foetal anomaly, macrosomia and neonatal death. Foetal anomaly and still-birth are related to the quality of glucose control in early pregnancy.⁷
- If a woman with diabetes who is planning to become pregnant needs intensification of blood glucose-lowering therapy, advise her to increase the frequency of SMBG to include fasting levels and a mixture of pre-meal and post-meal levels. (See 'Recommendations for SMBG Regimens' below)⁴.
- After birth: Refer women with pre-existing diabetes back to their routine diabetes care arrangements⁴
- See <u>NICE guideline on diabetes in pregnancy</u> for further advice.

TREATMENT GROUP	RECOMMENDATIONS FOR SMBG REGIMENS	RECOMMENDED TESTING FREQUENCY when not using additional CGM	ADDITIONAL INFORMATION
Pre- conception, pregnancy & gestational diabetes	Type 1: PRE-CONCEPTION & PREGNANCY	Usually 7 – 15 times a day	Please note, specialist teams may advise additional testing
	Type 2: PRE-CONCEPTION & PREGNANCY	Usually 4 – 12 times a day	dependent on individual circumstances
	Gestational DIABETES	Usually 4 - 8 times a day	

OTHER CONSIDERATIONS

TREATMENT GROUP	RECOMMENDATIONS FOR SMBG REGIMENS	
Driving with insulin or	Check DVLA website for the most up-to-date information on SMBG requirements for individuals with diabetes. Healthcare professionals	
insulin secretagogues	offering SMBG to people who drive and are at risk of hypoglycaemia must consult the mandatory Driver and Vehicle Licensing Agency (DVLA)	
	guidance ³ , boxes 1-3, and advise the individual.	
[Sulfonylureas and meglitinides	Resources include: <u>At a glance guide to the current medical standards of fitness to drive.</u> And <u>Diabetes mellitus: assessing</u>	
(glinides)]	<u>fitness to drive</u>	
Ketosis Prone T2DM	If on insulin, follow guidance on insulin treated T2DM. If not on insulin, SMBG should be made available regardless of therapy. More frequent	
	testing may be required for example in scenarios outlined in box 3. Blood or urine ketone testing may also be required. Please follow	
	recommendations from the specialist team	
People with T2DM:		
Those taking oral steroids		
Post bariatric surgery		
Post organ transplant	Recommendations on SMBG frequency will be made by the specialist teams	
Pancreatic insufficiency		
Haemoglobinopathies (i.e.		
sickle cell, thalassaemia)		

Preferred Blood Glucose Meter, Ketone Meter, Test strip and Lancet Choice

In April 2023, NHS England published "<u>Commissioning recommendations following national</u> <u>assessment of blood glucose and ketone meters, testing strips and lancets</u>" after undertaking a detailed evaluation process that considered both quality and cost using a national specification. This was developed with various stakeholders including diabetes specialist nurses, consultants, pharmacists and people living with diabetes.

South East London ICB have developed a 'preferred' list of blood glucose and ketone meters, test strips and lancets to be used across South East London (see page 7), based on the NHSE recommended list. Meters should be selected based on the patient's needs, ability to use and preferences. Patient education on use must be provided when supplying the patient with the device by competent clinical staff.

The preferred meter choices are expected to be suitable for most patients, however it is recognised that some patients may have individual needs and may require an alternative choice. If an alternative meter, test strip or lancet is needed, a non-preferred meter may be used however this should still be in line with the <u>NHSE recommended list</u>.

Very Occasionally, for specific individuals, diabetes specialist teams may initiate an alternative meter that is not on the NHSE recommended list to meet specific needs of a patient. An example of this situation may be where a patient has dexterity issues and require an **Accu-chek Instant Meter** which includes a FASTCLIX lancing device. In these specific cases the diabetes specialist team will need to inform the GP of this to support ongoing prescribing of consumables. Where a non-preferred meter is used, meter choice should take into consideration the cost of the test strips (which can be found in the <u>Drug Tariff</u>).

Insulin Pumps: If an individual is using an insulin pump they may require a meter that synchronises with the pump, therefore the meter should not be changed in primary care. Please refer to the specialist teams if any review is required. Examples of insulin pumps which may require specific meters are:

Insulin Pump	Compatible test strips
Medtronic MiniMed [™] 780G	Accu-chek Guide Test Strips
Medtronic MiniMed [™] 640G	Contour Next Test Strips
Medtronic MiniMed [™] 670G	Contour Next Test Strips
mylife YpsoPump	mylife Aveo or mylife Unio

CGM: Individuals using CGM devices do not require specific meters and should follow this guidance.

Lancets and Lancing Devices: Lancing devices are supplied free of charge with the meters, however cannot be prescribed on an FP10 prescription. If the lancets provided with the meter are not suitable for the individual, a non-preferred lancet may be used, check compatibility with the lancing device provided, the choice should still be in line with the <u>NHSE recommended list</u>. The higher the gauge (G) of the lancet, the smaller the diameter of the needle. If a patient complains of pain the higher gauge such as 33G should be recommended.

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Attention Description etone Test Strip Expiry 18 months from the date of manufacture incet GlucoJect PLUS 0.22mm/33g (10 supplied with meter) 4SURE Lancets (10 lancets supplied with meter)	Compatible Ketone Test Strips	GlucoFix Tech B-Ketone Sensors Test Strips (not supplied with meter)	B 4SURE beta-ketone Test Strips (1 supplied with meter)	
Incet GlucoJect PLUS 0.22mm/33g (10 supplied with meter) 4SURE Lancets (10 lancets supplied with meter)	Ketone Test Strips Cost/10	£9.95 per Pack/10	£9.92 Pack/10	
	Ketone Test Strip Expiry	18 months from the date of manufacture	18 months from date of manufacture	
ist per 100 lancets £3.77/100 £3.45/100	Lancet	GlucoJect PLUS 0.22mm/33g (10 supplied with meter)	4SURE Lancets (10 lancets supplied with meter)	
	Cost per 100 lancets	£3.77/100	£3.45/100	
ontact details for ordering meters Miriam Salib, Email <u>msalib@menarinidiag.com</u> , Phone 07710062415 sales.support@nipro-group.com	Contact details for ordering meters	Miriam Salib, Email msalib@menarinidiag.com, Phone 07710062415	sales.support@nipro-group.com	



Category	Blood glucose only Meters: Suitable for the majority of people with Type 2 diabetes		
Preferred	GlucoFix Tech GK	Contour Plus Blue	Finetest Lite
meters:			
Company:	A.Menarini Diagnostics	Ascensia	Neon Diagnostics
Enzyme technology	Glucose Oxidase	Glucose Dehydrogenase (GDH), unaffected by oxygen therapy	GDH-FAD
Connectivity	QuickLink NFC and USB cable	Bluetooth, USB Cable, Smart phone connectivity	Bluetooth, USB Cable & Smart phone connectivity
Applications	GlucoLog Lite, GlucoLog Web & RapidCalc Bolus Advice App Glooko	Contour Diabetes App GlucoContro.online Glooko	Finetest Lite App Glooko
Memory	730 results	800 results	500 results on meter, unlimited on app
Sample size	0.5µL- Glucose	0.6µL- Glucose	0.5µL- Glucose
Reaction time	5 Seconds	5 Seconds	5 Seconds
Warnings	Hypo/Hyper alert up to six settable acoustic alarms (3 glucose	Lo and Hi warnings if the reading is outside the measurement	Inserting used strips, Low blood volume, Low battery, High/low
	alarms & 3 ketone alarms)	range. (0.6mmol/L to 33.3mmol/L	temperature, Operation issues
Alerts	Hypo & hyper alerts & four markers available	Alarm reminders can be set for 30, 60, 90 and 120 minutes	Hypo and Hyper Alerts, Three Meal Markers, Five programmable alarm
Other features	No coding needed Meal markers Strip ejector Averages 1, 7, 14, 30, 60, 90 days	SmartCOLOUR [®] target range indicator, Meal markers (fasting, pre and post meal) Second Chance Sampling Wide haematocrit range (0%-70%)	One-Step Bluetooth pairing Auto Strip Ejector No coding needed Programable average readings
Additional cohorts	Carbohydrate counting, Group 2 driver, renal dialysis	Group 2 driver, renal dialysis	Group 2 driver, renal dialysis
Technical help	www.glucomen.co.uk/glucofix-tech	https://www.diabetes.ascensia.co.uk/support	https://www.neondiagnostics.co.uk/
Patient helpline	0800243667 (8:30 - 17:00 Mon to Fri)	0345 600 6030 or 0800 170 1060 (09:00 17:00 Mon to Fri)	0800 131 3378 (24 hours a day)
Blood glucose test strip	GlucoFix Tech Sensors Test Strips	Contour Plus Test Strips	Finetest Lite test strips
Cost per 50 test strips	£5.95 Pack/50	£5.95 Pack/50	£5.95 Pack/50 (2 x 25 strip pots)
Test strip expiry	12 months from opening (within date of expiry)	24 months from manufacture	6 months after opening (within date of expiry)
Lancets	GlucoJect PLUS 0.22mm/33g lancets	MICROLET® 0.5mm/28G Lancets (5 supplied with meter)	GreenLan 28G Lancets (10 supplied with meter)
Cost per 100 lancets	(10 supplied with meter) £3.77/100	f2.99/100	£3.00/100
Contact details for ordering meters	Miriam Salib: Email <u>msalib@menarinidiag.com</u> Phone 07710062415	Jamie Goldstein, Business Development Manager 07469 912 554	Freephone - 0800 009 3378 Email – <u>info@neondiagnostics.co.uk</u> Local contact – Vipul Upadhyaya 07526 507576, Vipul@neondiagnostics.co.uk



Category	Type 2 Diabetes Gestational diabetes -GDm-Health	Voice Meter	
Preferred	WaveSense JAZZ wireless	On Call Extra Voice	
meters:			
Company:	AgaMatrix	Connect 2 Pharma	
	5.6 ****	To Call Ears Note To 221 wr 58 (1984) repat	
Enzyme Technology	Glucose Oxidase	Glucose Oxidase	
Connectivity	Bluetooth	USB download capability	
Applications	AgaMatrix diabetes manager app ALLY diabetes patient management system, GDm-Health, Diasend, Glooko, Apple Health, My mHealth, Social Diabetes	On Call [®] Diabetes Management Software	
Memory	1000 results	500 results	
Sample Size	0.5µL	0.4 μL	
Reaction time	5 seconds	5 seconds	
Warnings	Faulty strip, Low/dead battery, Temperature	Hyper, Hypo, Ketone	
Alerts	High and Low results	Five daily test reminders	
Other features	Auto-detection of QC Auto-synchronisation Simple pairing	Re-dosing capability within 3 seconds Strip ejector Soft touch buttons Easy insert strip port Audio Guidance Audible fill detection	
Technical help	www.agamatrix.co.uk	https://www.oncallmeters.co.uk/	
Patient helpline	0800 093 1812 (8:00 – 18:30 Mon - Fri)	02033074646 (hours to be confirmed)	
Blood Glucose Test Strip	WaveSense JAZZ Test Strips	On Call Extra Test Strips	
Cost per 50 test	£8.74 Pack/50	£5.20 Pack/50	
strips	Emonths from opposing (within data of evalue)	12 months from ononing (within data of evalue)	
Test strip Expiry	6 months from opening (within date of expiry)	13 months from opening (within date of expiry)	
Lancets	WaveSense Ultra-Thin 0.2mm/33G or 0.35mm/28G lancets (30 supplied with meter)	On call 30G lancets (10 supplied with meter)	
Lancet cost	£5.43/200	f2.17/100	
Contact details for ordering meters	To be confirmed	To be confirmed	

Standards - As a minimum, all recommended devices are complaint with the ISO Standard ISO 15197:2015, measure in mmol/l and provide plasma-calibrated meter readings only.

Prices - All prices quoted in the commissioning recommendations are the prices contained within the drug tariff as of 1st April 2023, which can be subject to change. NHS England will continue to monitor the drug tariff prices to ensure they continue to deliver best value. Supply of meter

Supply - All suppliers will provide meters, lancing devices, and ongoing free control solutions and replacement batteries free of charge to all healthcare settings across England in primary care, secondary care and to service users.

Quantities prescribed - The quantity of test strips prescribed should match the expected need. Both over- and under-prescribing should be avoided.

References

- National Institute for Health and Care Excellence (NICE) Clinical guideline NG17 Type 1 diabetes in adults: diagnosis and management. Initial Publication: August 2015. Accessed June 2024.
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- National Institute for Health and Care Excellence (NICE) Clinical guideline NG18 –Diabetes (type 1and type 2) in children and young people: diagnosis and management. Initial Publication: August 2015. Accessed June 2024.
- National Institute for Health and Care Excellence (NICE) Clinical Knowledge Summary (CKS) Diabetes

 type 2. Accessed June 2024.
- **7.** Nick Lewis-Barnard et.al; 2014; The National Pregnancy in Diabetes Audit: What does it tell us and what should we be doing?; Diabetes Update. Accessed October 2020
- 8. NHS England : Commissioning recommendations following the national assessment of blood glucose and ketone meters, testing strips and lancets. Accessed June 2024

Glossary of terms

- BG Blood Glucose
- **SMBG** Self Monitoring of Blood Glucose
- CGM Continuous Glucose Monitoring
- T1DM Type 1 Diabetes Mellitus
- T2DM Type 2 Diabetes Mellitus
- Young person A person between the ages of 16 -18 years old. *NB.* This age range varies dependent on the definition source. No definitive legal classification exists.
- Specialist Consultant or GPwSI or appropriately trained diabetes specialist practitioner (GP, nurse or non-medical prescriber)
- **DPP4i** dipeptidyl peptidase 4 inhibitor
- SGLT-2 sodium glucose co-transporter 2
- GLP-1 analogue Glucagon-like peptide-1 receptor analogue

Acknowledgements

- University Hospitals of Leicester NHS Trust. (2016). Type 2 Diabetes Management Guidelines. Leicestershire Diabetes Guidelines.
- Greater Manchester Medicines Management Group. (2015). Prescribing guidance in the self-monitoring of blood glucose (SMBG).
 GMMMG.
- BGL Primary Care Guidelines for the Management of Type 2 Diabetes Mellitus (2017). Bexley CCG, Lewisham CCG, Greenwich CCG.

South East London Integrated Medicines Optimisation Committee (SEL IMOC). A partnership between NHS organisations in South East London: South East London Clinical Commissioning Group (covering the boroughs of Bexley/Bromley/Greenwich/Lambeth/Lewisham and Southwark) and GSTFT/KCH /SLaM/ Oxleas NHS Foundation Trusts and Lewisham & Greenwich NHS Trust

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