NHS
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Sheffield prescribing guidance in the self-monitoring of blood glucose (SMBG) for adults, children and young people

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Introduction

This Guidance aims to support people with diabetes and healthcare professionals involved in their care, to achieve optimal glycaemic control through the effective use of self-monitoring of capillary blood glucose.

Self-Monitoring of Blood Glucose (SMBG) is an integral part of diabetes management.
SMBG is particularly aimed at those taking medication that requires dose adjustments (e.g. insulin), those who have fluctuating blood glucose levels, or who are at increased risk of hypoglycaemia either due to medication, co-morbidities, or other risk factors.

This Guidance refers to SMBG only, see South Yorkshire Guidance for Continuous Glucose Monitoring (CGM) in Adults and Children with Type 1 and Type 2 Diabetes for advice on Continuous Glucose Monitoring (CGM), which measures interstitial glucose levels.

See here for advice from the DVLA.

Recommendations

When to consider prescribing

SMBG should only be initiated if the need/purpose is clear and agreed with the patient and/or their caregivers. All recommendations should be clearly documented in their medical records.

Patients using CGM first line will still need to take capillary blood glucose measurement (see table), although they can do this less often; prescription quantities/duration of SMBG should be amended accordingly when changed to CGM.

Adults

Type 1 diabetes – See table for SMBG recommendations.

NICE NG17 (Type 1 diabetes in adults: diagnosis and management) recommends:
- CGM is offered first line to adults with T1D.
- Offer SMBG to all adults with T1D who cannot use or do not want CGM, which is offered as first line.

Type 2 diabetes – See table for SMBG recommendations.

NICE NG28 (Type 2 diabetes in adults: management) recommends:
- SMBG is not routinely offered for type 2 diabetes (T2D) unless.
  - 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/planning to become pregnant.
- Consider short-term SMBG in T2D:
  - when the person is starting with oral or intravenous corticosteroids or
  - to confirm suspected hypoglycaemia.
- Offer CGM if any of the following apply:
  - they have recurrent hypoglycaemia or severe hypoglycaemia.
  - they have impaired hypoglycaemia awareness.
  - they have a condition or disability (including a learning disability or cognitive impairment) that means they cannot self-monitor their blood glucose by SMBG but could use CGM.
  - they would otherwise be advised to self-measure at least 8 times a day.

Children and young people (NICE NG18 - Diabetes (type 1 and type 2) in children and young people: diagnosis and management).

Type 1 diabetes: See table for SMBG recommendations.

NICE NG18 (T1D) recommends children and young people with T1D:

All are offered CGM as first line with blood glucose monitoring offered to those who cannot use or do not want CGM.

Type 2 diabetes: See table for SMBG recommendations.

NICE NG18 (T2D) recommends children and young people with T2D:

- Equipment for capillary blood glucose testing is offered. Adjust the frequency of capillary blood glucose monitoring based on the person's treatment and whether they are using CGM.
- CGM is offered if any of the following apply. They:
  - have a need, condition, or disability (including a mental health need, learning disability or cognitive impairment) that means they cannot engage in monitoring their glucose levels by capillary blood glucose monitoring.
  - would otherwise be advised to self-monitor at least 8 times a day.
  - have recurrent or severe hypoglycaemia.
- Consider CGM if on insulin therapy.

Pregnancy (NICE NG3 - Diabetes in pregnancy: management from preconception to the postnatal period)

Type 1 diabetes: See table for SMBG recommendations.

- Offer CGM to all pregnant women with T1D.

Type 2 diabetes: See table for SMBG recommendations.

- Consider CGM for pregnant women who are on insulin therapy but do not have type 1 diabetes, if:
  - they have problematic severe hypoglycaemia (with or without impaired awareness of hypoglycaemia) or
  - they have unstable blood glucose levels that are causing concern despite efforts to optimise glycaemic control.
- All pre-conception and pregnant women with pre-existing diabetes or gestational diabetes should be offered SMBG.
- 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. This will include awaking fasting blood glucose and pre-meal and post-meal blood glucose levels as per local recommendations.
- After birth: Refer women with pre-existing diabetes back to their routine diabetes care arrangements.

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.

All patients

In addition to SMBG, all patients should have their glycaemic control measured by HbA1c (glycated haemoglobin).

Regular HbA1c testing remains the gold-standard test and is recommended every 3 months in children/young people and every 3-6 months in adults (tailored to individual needs).

For blood glucose and HbA1c targets see patient's care plan and NICE NG 28 patient decision aid.

At initiation

1. Patients should receive education relevant to appropriate SMBG, understanding when to test and what to do with the result. Refer adult patients to ”Your diabetes: Understanding your blood glucose test results (Sheffield Teaching Hospitals NHS Trust)” patient information leaflet.

2. Offer locally recommended, quality assured and international standard (ISO) compliant blood glucose monitoring devices. (see link to Sheffield formulary Test Strips for Self-Monitoring Blood Glucose (SMBG) pending update).

3. Ensure compatible blood glucose monitoring device and testing strips are used. Do not offer multiple/ differing devices e.g., for home, work, and car.

4. Some patients will require SMBG devices chosen by their specialist care team. Where an alternative meter to the locally recommended one is chosen, the healthcare professional should specify the reason for their preferred choice to reduce the risk of subsequent change in primary care.

Ongoing use/review

1. The continued need for SMBG should be assessed **at least annually** or more frequently according to need and include:
    - the person's self-monitoring skills
    - the quality and frequency of testing
    - checking that the person knows how to interpret the blood glucose results and what action to take
    - the impact on the person's quality of life
    - the continued benefit to the person
    - the equipment used.

2. Any patient encounter is an opportunity to identify SMBG use, explore patients’ beliefs and motivation for using SMBG and allow patients to set goals in line with their care plans.

3. The recommended number of blood glucose testing strips (BGTS) is only a guide, and some patients needs may vary.

4. Be aware that there are increased risks of blood glucose variation in some patients, and they may require increased testing frequency during:
    - acute inter-current illness
    - pregnancy/pre-conception
    - changes in therapy that may alter blood glucose results
    - changes in lifestyle/routine or
    - at times where erratic results may be dangerous
    - periods of altered hypo awareness.

5. There should be no restriction on the supply of BGTS in T1D or pregnant women. Concerns about over usage should be referred to the specialist diabetes team. See T1D in table.

6. Expiry dates of BGTS should be considered and patients should be encouraged to help reduce waste by using strips before ordering more.

References

- NICE Clinical Guideline NG17 – Type 1 diabetes in adults: diagnosis and management. August 2015, last updated August 2022
- NICE Clinical guideline NG28 – Type 2 diabetes in adults: management. December 2015, last updated June 2022
- GOV.UK. Driver & Vehicle Licensing Agency (DVLA) For medical practitioners – Assessing fitness to drive: a guide for medical professionals. March 2016, last updated June 2022
- NICE Clinical guideline NG3 - Diabetes in pregnancy: management from preconception to the postnatal period. February 2015, last updated December 2020
- NICE Clinical guideline NG18 –Diabetes (type 1and type 2) in children and young people: diagnosis and management. August 2015. Last updated May 2023

Recommendations for SMBG adapted from NICE guidance (see references) and local advice from SSCDS, SCH and Diabetes Midwifery at Jessop

Adults			
	Frequency	**Qty of BGTS**	**Additional Information**
Type 1 Diabetes **SMBG** recommended for ALL T1D not using CGM	Recommended at least 4 times a day, including before each meal and before bed, and up to 10 times if need be. See considerations for where additional testing might be needed: e.g. before, during and after sports NICE NG 17.	3-6 boxes (50 per box) needed per month	Greater risk of hypoglycaemia /hyperglycaemia. More frequent testing indicated in certain circumstances e.g., patients on insulin pump therapy. May need to test for ketones.
Type 2 Diabetes **SMBG** NOT routinely needed for T2 unless: insulin treated, on medication that may increase risk of hypoglycaemia, evidence of hypoglycaemic episodes or pregnancy See NG28 and NG18 for guidance on when CGM is preferred.	If on once daily insulin regimen should test minimum once daily and additional times relevant to hypoglycaemia, illness or driving. Twice daily insulin should test 2 times daily and additional times relevant to hypoglycaemia, illness or driving. If more than twice daily insulin regimen: test up to 4 times a day. Combined insulin therapy and oral antidiabetic drugs regimen – test once a day varying time of testing Oral antidiabetic medication: Sulfonylurea alone (eg gliclazide) or in combination with other oral agents or with GLP-1 analogue (eg exenatide, liraglutide). Rapid acting insulin secretagogue (eg repaglinide). May need to test once daily up to 3 times a week at varying times due to increased risk of hypoglycaemia (note consider review NG28 Visual summary Type 2 diabetes in adults: choosing medicines)	Up to 1 box per month (50 per box) 1-2 boxes per month (50 per box) 2-3 boxes per month (50 per box) 1-2 boxes every 2 months (50 per box) 1 box every 2-4 months if stable or 1 box each month	May need to test regularly when suffering from intercurrent illness or unstable condition, and when driving as detailed in the DVLA requirements
T1D & T2D and on CGM	Frequency varies: • to check the accuracy of their CGM device • if the device stops working • when their blood glucose levels are changing quickly • in line with DVLA recommendations	As per patient's care plan 1 box of 50 every 2 months	For more info see NG17; NG18; NG28 Please note, SY ICB CGM guidance pending Please note, specialist teams may advise additional testing dependent on individual circumstances.

Children and Young People

NG18 recommends all children and young people with T1D should be offered CGM as first line with blood glucose monitoring offered to those who cannot use or do not want CGM.

	Frequency	Qty of BGTS	Additional Information
Type 1 Diabetes **SMBG**	Local guidance recommends at least 6-8 times a day (note increased frequency compared to NICE at least 5 times a day). Additional testing might be needed: e.g. before, during and after sports; during intercurrent illness.	4 boxes per month (50 per box)	For more info see NG18 and SCH communications/patient's care plan
Type 2 Diabetes **SMBG**	Local guidance: • If on monotherapy with metformin: test at least 4 times a day or offer CGM. SMBG frequency may reduce as blood glucose levels stabilise. • If on active insulin treatment: 6-8 times a day (same as T1D)	2 boxes if on metformin/oral therapy 4 boxes (if on active insulin)	
T1D &T2D and on CGM	Frequency varies: • to check the accuracy of their CGM device • if the device stops working • when their blood glucose levels are changing quickly • on changing treatment (i.e. adding extra medication or titrating doses)	As per patient's care plan 4 boxes of 50 every month	Please note, specialist teams may advise additional testing dependent on individual circumstances.

Pregnancy

	Frequency	Qty of BGTS	Additional Information
Pre-conception, pregnancy (T1D, T2D) & Gestational Diabetes (GD)	T1D pre-conception & pregnancy usually 7-15 times a day T2D pre-conception & pregnancy usually 4-12 times a day GD usually 4-8 times a day	3-4 boxes per month (50 per box) – **this is for information only, not to be applied as a restriction to supply.**	Please note, specialist teams may advise additional testing dependent on individual circumstances. For more info see NG 3
If on CGM	Frequency varies: • to check the accuracy of their CGM device • if the device stops working • when their blood glucose levels are changing quickly in line with DVLA recommendations	1 box of 50 every 2 months	

DVLA requirements for SMBG		
DVLA requirements for SMBG Diabetes mellitus assessing fitness to drive	**Group 1 Entitlement - car, motorcycle**	**Group 2 Entitlement – LGV/PCV (lorry/bus)**
Insulin treated: See DVLA recommendations here: Insulin treated diabetes Patients can find more information from DVLA here: Guide to insulin treated diabetes and driving	Check glucose levels no more than 2 hours before the start of the first journey and every 2 hours after driving has started.	Check blood glucose levels at least twice daily, even on non-driving days, and no more than 2 hours before the start of the first journey and every 2 hours after driving has started.
CGM	These systems may be used for monitoring glucose at times relevant to driving Group 1 vehicles. Users must confirm blood glucose level with a finger prick reading in the following circumstances: ▪ when the glucose level is 4.0 mmol/L or below ▪ when symptoms of hypoglycaemia are being experienced when the glucose monitoring system gives a reading that is not consistent with the symptoms being experienced	Interstitial fluid glucose monitoring systems are not permitted for the purposes of Group 2 driving and licensing. Group 2 drivers who use these devices must continue to monitor blood glucose levels with finger prick testing.
Medication managed/non-insulin managed (with hypoglycaemic risk). See DVLA recommendations here: Diabetes treated by medication other than insulin Patients can find more information from DVLA here: Information for drivers with diabetes treated by non-insulin medication, diet, or both	May be appropriate to test at times relevant to driving to enable the detection of hypoglycaemia	Test at least twice daily and at times relevant to driving ie no more than 2 hours before the start of the first journey and every 2 hours while driving.

Document control

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