

Guidance for Self-monitoring of Blood Glucose (SMBG) in patients with Diabetes Mellitus

This guidance is intended to assist healthcare professionals to identify patients eligible for SMBG, support effective blood glucose testing and determine the appropriate quantity of test strips and lancets to prescribe. The need for a meter for people diagnosed with diabetes will be assessed by a healthcare professional, and if required, a suitable formulary meter should be supplied to the patient. Formulary meter choices can be found at the following [link](#).

This guidance is for use by healthcare professionals when considering SMBG for new patients and at the point of review for existing patients.

For patients eligible for SMBG, the following [tool](#) can be used to calculate the appropriate quantities of blood glucose test strips and lancets to prescribe.

Eligibility Criteria^{1,2,3}

When to offer SMBG

- Type 1 diabetes (T1DM)
- Type 2 diabetes (T2DM) **AND**
 - the person is on insulin **or**
 - there is evidence of hypoglycaemic episodes **or**
 - the person is on a sulfonylurea or a glinide, and drives or operates machinery **or**
 - the person is pregnant or planning to become pregnant.

When to consider short-term SMBG

- In T2DM
 - During illness or medication changes **or**
 - When starting treatment with oral or intravenous corticosteroids **or**
 - To confirm suspected hypoglycaemia **or**
 - To determine the effect of lifestyle changes before commencing rescue therapy

Test strips / lancets should be issued as an acute prescription and quantity should be appropriate for frequency and duration of SMBG.

When not to offer SMBG

- T2DM in **adults** that is:
 - newly diagnosed **or**
 - controlled by diet and lifestyle alone **or**
 - controlled by any of the following oral agents (alone or in combination with one another): metformin, DPP-4 inhibitor, SGLT2 inhibitor, GLP-1 receptor agonist, pioglitazone, acarbose.

Getting the most from capillary blood glucose monitoring⁴

- ✓ Correct user technique is critical. The person performing the test should receive appropriate training on testing blood glucose levels and use of the meter.
- ✓ Testing strips should be in date and should display the date of opening. Strips should be stored at the correct temperature and in manufacturer's packaging. The lid should be replaced on the container promptly after removing a strip to keep the contents in the correct condition.
- ✓ The individual's hand or finger should be washed and dried before testing. A sufficient blood sample should be obtained (using the side of the finger and an appropriate finger pricking device and technique). The lancet should only be used once and then disposed of safely.
- ✓ Every person who is asked to perform glucose monitoring should be provided with the correct means of safe disposal of their sharps, i.e. lancets. A sharps bin should be close to the individual being tested to reduce the risk of sharps injury.
- ✓ The meter should show results in mmol/L not mg/dL.
- ✓ The user should be aware of the degree of error, especially in the low blood glucose range.
- ✓ The user should know to re-check if blood glucose readings do not match their symptoms.
- ✓ People having abnormalities with haematocrit, haemoglobinopathies or anaemia may experience inaccurate readings.

The table below provides an indication of the **quantity** of blood glucose testing strips and lancets to be prescribed for patients requiring SMBG.

Treatment Group	Suggested Monitoring Guide	Guide test strip/lancet requirements	
T1DM	<ul style="list-style-type: none"> ✓ SMBG is integral in the treatment of all people with T1DM. ✓ People with T1DM should be educated in SMBG to adjust treatment accordingly. ✓ Self-testing four times a day (at least five times a day for children) will be required to gain optimal control, avoid hypoglycaemia, and avoid metabolic emergencies such as diabetic ketoacidosis (although less frequent testing may be appropriate in patients with good control and good hypoglycaemia awareness). 	<ul style="list-style-type: none"> ✓ Guide requirement: 150-200 test strips / lancets per month ✓ Additional test strips / lancets may be required for patients experiencing poor blood glucose control, on insulin pump therapy, children or those who drive regularly. 	<p>Quantities shown are based on typical testing routines.</p> <p>Individual requirements will vary & depend on recommended testing frequency.</p>
Pregnant women with diabetes	<ul style="list-style-type: none"> ✓ Pregnant women with T1DM, T2DM or gestational diabetes controlled with insulin, oral antidiabetic drugs or diet alone should test blood glucose levels four times day or more to achieve tight glycaemic control. ✓ Testing should include both fasting and postprandial blood glucose measurement. 		
Diabetic patients on Continuous Glucose Monitoring (CGM)	<ul style="list-style-type: none"> ✓ CGM measures interstitial glucose levels. Patients who use CGM still need to take blood glucose measurements, but less often. ✓ Blood glucose monitoring is required to check the accuracy of their CGM device and as a backup when blood glucose levels are changing quickly, or the device stops working. ✓ When CGM is commenced, prescribed quantities of blood glucose test strips/lancets should reduce. Diabetes specialists initiating CGM will advise on the reduced quantity of test strips/lancets to prescribe. 	<ul style="list-style-type: none"> ✓ Guide requirement: 100-150 test strips / lancets per month ✓ Occasionally, additional test strips/lancets may be required for patients experiencing poor blood glucose control. These should be prescribed as an acute prescription, and advice and guidance sought from specialists. 	<p>Expiry dates should be taken into consideration.</p> <p>Both test strips and lancets are for single use and equal quantities should be needed/provided.</p>
Insulin-treated T2DM	<p>Insulin therapy using twice daily mixed insulin or MDI (multiple daily injections)</p> <ul style="list-style-type: none"> ✓ On initiation, regular monitoring 2 to 4 times a day is required to achieve optimum glycaemic control. ✓ Increase testing during periods of illness, instability or use of oral steroids, and following changes in insulin dosage. 	<ul style="list-style-type: none"> ✓ Guide requirement: 100-150 test strips / lancets per month ✓ Additional test strips / lancets may be required for complex patients or those who drive regularly. 	<p>Continuation and frequency of use should be evaluated at each review.</p>
	<p>Basal insulin therapy once or twice daily</p> <ul style="list-style-type: none"> ✓ Usually twice daily 2 to 3 times a week at varying times. ✓ Increase testing during periods of illness, instability or use of oral steroids, and following changes in insulin dosage. 	<ul style="list-style-type: none"> ✓ Guide requirement: 50 test strips / lancets on alternative months ✓ Additional test strips/lancets may be required for those who drive regularly. 	
T2DM on sulfonylurea / glinide (alone or in conjunction with other therapies)	<ul style="list-style-type: none"> ✓ SMBG is recommended in the following circumstances: <ul style="list-style-type: none"> • at times relevant to driving (see DVLA guidance) • symptomatic hypoglycaemia • suspected asymptomatic hypoglycaemia • periods of illness • instability or use of oral steroids • increased risk of hypoglycaemia due to renal impairment or high alcohol intake 	<ul style="list-style-type: none"> ✓ Guide requirement: 50 test strips / lancets per month as required. ✓ Prescribe as acute prescription unless the patient is at increased risk of hypoglycaemia or the patient drives regularly. 	<p>Where regular testing is not required, consider issuing as acute prescriptions rather than as repeat prescriptions.</p>

Treatment Group	Suggested Monitoring Guide
<p>T2DM on metformin / DPP-4 inhibitor / SGLT2 inhibitor / GLP-1 receptor agonist / pioglitazone / acarbose (alone or in combination with one another)</p>	<p>SMBG should not routinely be recommended for adults. ✓ Glycaemic control is best monitored through HbA1c testing</p> <p>All children and young people with T2DM need to self-monitor blood glucose levels.⁵ The paediatric diabetes specialist team will advise on the frequency of testing and quantity of test strips/lancets to prescribe. For example:</p> <ul style="list-style-type: none"> • Diet and lifestyle management – 2-3 glucose checks per week • Tablet medication – 4-5 glucose checks per week
<p>Diet and lifestyle-controlled T2DM</p>	<p>Occasionally, additional test strips/lancets may be required (e.g. change in medication, prior to clinic)</p>

Blood glucose self-monitoring for drivers⁶

Full DVLA guidance for assessing fitness to drive for people with diabetes can be found at the following [link](#). Please refer to this guidance for detailed information on when the person with diabetes must notify/contact DVLA and the criteria that must be met for DVLA to license the person.

The following information summarises the blood glucose testing requirements for group 1 and group 2 drivers with diabetes who are treated with insulin or treated with tablets carrying hypoglycaemia risk (sulfonylureas and glinides)

- **Treated with Insulin**

Group 2 Drivers (lorries/buses)

- At least **twice** daily blood glucose monitoring including on days when not driving.
- No more than 2 hours before the start of the first journey and every 2 hours after driving has started.
- A maximum of 2 hours should pass between the pre-driving glucose test and the first glucose check performed after driving has started.
- More frequent self-monitoring may be required with any greater risk of hypoglycaemia (physical activity, altered meal routine)
- Use glucose meter with memory function to ensure 6 weeks of readings whilst on insulin will be available for assessment.

Group 1 Drivers (cars/motorcycles):

- Glucose testing no more than 2 hours before the start of the first journey and every 2 hours after driving has started.
- A maximum of 2 hours should pass between the pre-driving glucose test and the first glucose check performed after driving has started.
- More frequent self-monitoring may be required with any greater risk of hypoglycaemia (physical activity, altered meal routine)

- **Treated with tablets carrying hypoglycaemia risk (sulfonylureas and glinides)**

Group 2 Drivers (lorries/buses):

- At least **twice** daily blood glucose monitoring and at times relevant to driving i.e. no more than 2 hours before the start of the first journey and every 2 hours after driving has started.

Group 1 Drivers (cars/motorcycles):

- Appropriate glucose monitoring should be undertaken at times relevant to driving.

References:

1. National Institute for Health and Care Excellence (2015) Type 1 diabetes in adults: diagnosis and management [NG 17] <https://www.nice.org.uk/guidance/ng17> [Accessed 28 May 2024]
2. National Institute for Health and Care Excellence (2015) Type 2 Diabetes in adults: management [NG 28] <https://www.nice.org.uk/guidance/ng28> [Accessed 28 May 2024]
3. National Institute for Health and Care Excellence (2015) Diabetes in pregnancy: management from preconception to the postnatal period [NG 3] <https://www.nice.org.uk/guidance/ng3> [Accessed 28 May 2024]
4. Trend Diabetes (July 2020) Monitoring in adult diabetes: glucose and ketones https://diabetesmyway.nhs.uk/media/3843/hcp_monitoring_trend_final_new.pdf [Accessed 28 May 2024].
5. National Institute for Health and Care Excellence (2015) Diabetes (type 1 and type 2) in children and young people: diagnosis and management [NG 18] <https://www.nice.org.uk/guidance/ng18> [Accessed 4 June 2024]
6. Driver and Vehicle Licensing Agency (2016) Diabetes mellitus: assessing fitness to drive <https://www.gov.uk/guidance/diabetes-mellitus-assessing-fitness-to-drive> [Accessed at 28 May 2024]

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