

Guideline for Self-Monitoring of Blood Glucose (SMBG) in Adults with Diabetes

WHO SHOULD BE SELF-TESTING BLOOD GLUCOSE?

TYPE 1 DIABETES: All adults with type 1 diabetes should routinely monitor their blood glucose levels.³

TYPE 2 DIABETES: NICE guideline Type 2 diabetes in adults: management¹ (NG28, updated July 2016) does not recommend routine self-monitoring of blood glucose for patients with Type 2 diabetes unless they are:

- Patients on insulin treatment
- There is evidence of hypoglycaemic episodes
- Patients on oral glucose-lowering medications who may be at risk of hypoglycaemia while driving or operating machinery
- Patients who are pregnant or planning to become pregnant (see [NICE Guideline NG3](#) for more guidance)
- Consider short-term self-monitoring of blood glucose levels in adults with type 2 diabetes if:
 - Start treatment with oral or intravenous corticosteroids *OR*
 - To confirm suspected hypoglycaemia.

For type 2 diabetes, self-monitoring of blood glucose should only be offered as part of a structured blood glucose management plan and with diabetes self-management education.

Community nurse administered insulin: Community nurses are required to test blood glucose before administering insulin.

The table below provides guidance for frequency of testing, for healthcare professionals, to help develop appropriate SMBG management plans tailored to individual needs/factors and in conjunction with clinical judgement³.

WHO SHOULD NOT ROUTINELY SELF-TEST BLOOD GLUCOSE?

Unless there is a clinical indication and agreed purpose.

- Type 2 diabetes controlled by diet and exercise alone
- Type 2 diabetes controlled by metformin alone or in combination with pioglitazone, DPP-4 inhibitor (gliptin), or SGLT-2 inhibitors.

TYPE 2 DIABETES: MONITORING BLOOD GLUCOSE IN ACUTE INTERCURRENT ILLNESS

NICE states that there is little evidence of clinical benefit for short-term monitoring of blood glucose in patients with type 2 diabetes and acute intercurrent illness; however, NICE advises that clinicians should be aware of the potential risk of worsening hypoglycaemia and review treatment as necessary.¹

DVLA GUIDANCE AND LEGISLATION – see also Page 2 for further details.

NICE advises that the DVLA Guideline for Assessing Fitness to Drive: A Guide for Medical Professionals (Updated Feb 2017) recommendations on monitoring for patients with diabetes must be taken into account when offering self-monitoring of blood glucose levels to adults with diabetes.¹

The DVLA advise that the frequency of blood glucose testing should also depend on the clinical context.⁵ Increased monitoring and quantity of strips may be required depending on these circumstances.

The updated DVLA recommendations are available [here](#) and see page 2 for further details.

TYPE 2 DIABETES: STEPPING DOWN OR STOPPING SMBG

Review frequency of blood glucose testing and consider reducing or stopping testing where clinically appropriate if:

- No action is being taken on results
- Patient's treatment is changed and does not cause hypoglycaemia
- After pregnancy (if not breastfeeding)
- Recovered from an acute intercurrent illness, or on discharge from hospital, if applicable
- Monitoring is having a negative effect on lifestyle and wellbeing.

ANNUAL REVIEW OF SELF-MONITORING OF BLOOD GLUCOSE(SMBG)

NICE recommends SMBG should be assessed at least annually and in a structured way to check¹:

- Self-monitoring skills
- The quality and appropriate frequency of testing
- Interpretation of the results is appropriate and patient knows what action to take
- The impact on quality of life
- The continued benefit
- The equipment used.

Regular reviews can identify and support those who find it useful whilst discouraging those who gain no clinical benefit from testing.

Key Points:

- Ensure there is a clear agreed purpose for SMBG between clinician and patient
- Education and training must be provided to patients for the meter and testing process required, and how to interpret and action results on the uses of blood glucose
- Results should be used to inform diet, lifestyle and treatment changes, if SMBG is necessary.

N.B. SMBG does not replace regular HbA1c testing.

FOR FORMULARY RECOMMENDED BLOOD GLUCOSE TESTING STRIPS, SEE FACTSHEET 17 Formulary Choices: Blood Glucose and Ketone Testing Meters, available [here](#).

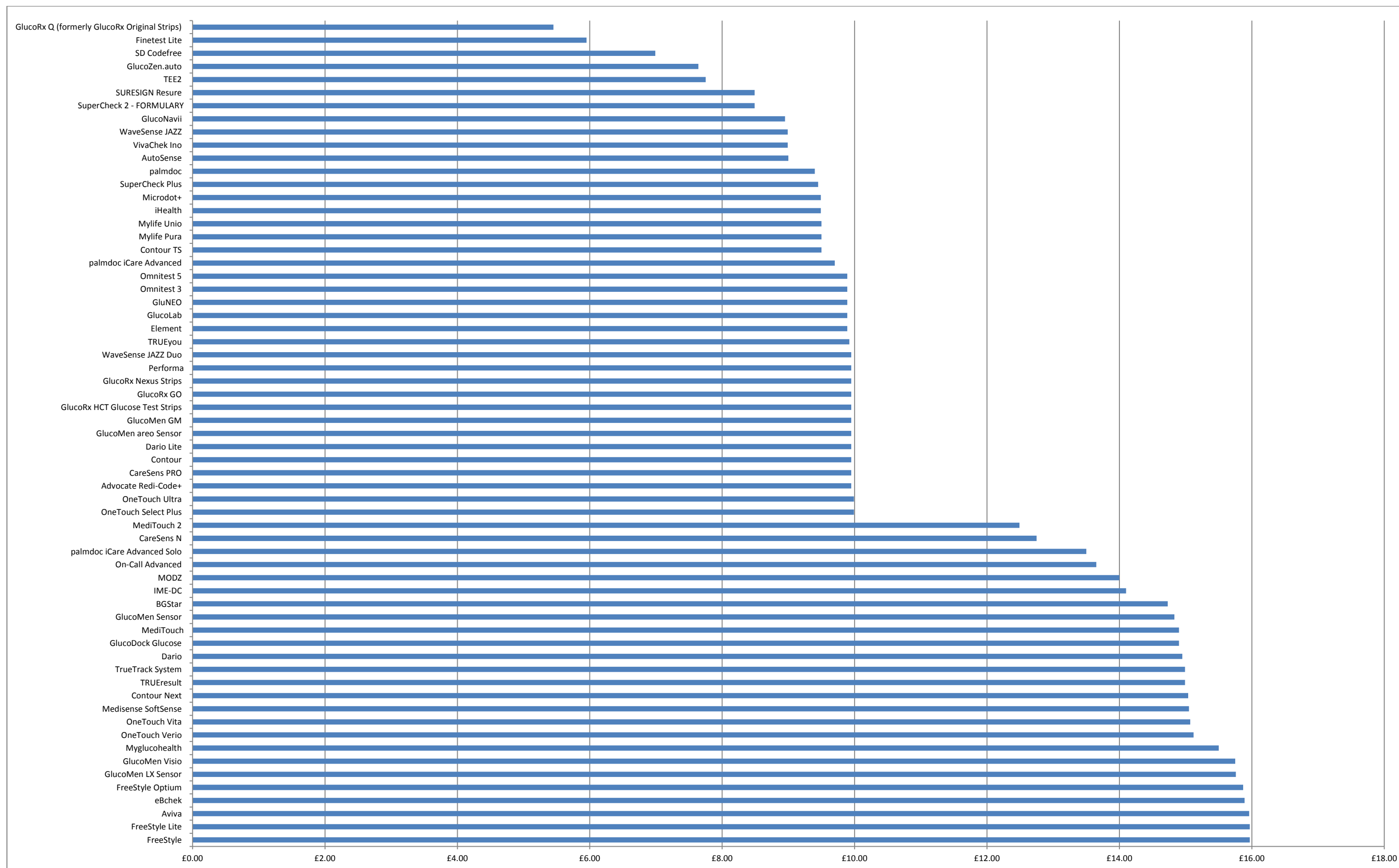
FOR COSTS COMPARISON OF BLOOD GLUCOSE TEST STRIPS AVAILABLE TO PRESCRIBE ON NHS, SEE APPENDIX 1, BELOW.

References:

1. NICE. Type 2 Diabetes in Adults: management. NG28, December 2015, updated July 2016. Available at <https://www.nice.org.uk/guidance/ng28>. Accessed on 03/04/2017.
2. NICE. Diabetes in pregnancy: management from preconception to the postnatal period. NG3, February 2015, updated August 2015. Available at <https://www.nice.org.uk/guidance/ng3>. Accessed on 03/04/2017.
3. NICE. Type 1 Diabetes in Adults: Diagnosis and Management. NG17, August 2015, updated July 2016. Available at <https://www.nice.org.uk/guidance/ng17>. Accessed on 03/04/2017.
4. DVLA. Assessing Fitness to Drive: A Guide for Medical Professionals, updated Feb 2017. Available at <https://www.gov.uk/government/publications/assessing-fitness-to-drive-a-guide-for-medical-professionals>. Accessed 03/04/2017.
5. Secretary of State's Honorary Medical Advisory Panel on Driving and Diabetes Minutes of meeting held 18th October 2011.
6. Drug Tariff April 2017 <http://www.nhsbsa.nhs.uk/PrescriptionServices/4940.aspx>.
7. PrescQIPP. Bulletin 46: Blood glucose test strips for patients with type 2 diabetes mellitus, August 2013. Accessed 03/04/2017.

Guideline for Self-Monitoring of Blood Glucose (SMBG) in Adults with Diabetes

Diabetes Type		TYPE 2 DIABETES			TYPE 1 AND 2 DIABETES	TYPE 1 DIABETES	SHORT-TERM INSULIN TREATMENT	
Treatment Group		Diet and Exercise Metformin, Pioglitazone Gliptins: Alogliptin, Linagliptin, Saxagliptin, Sitagliptin, Vildagliptin GLP-1 mimetics: Exenatide, Liraglutide. SGLT-2 inhibitors: Canagliflozin, Dapagliflozin, Empagliflozin.	Sulphonylureas alone: Gliclazide, Glibenclamide, Glipizide, Glimepiride, Tolbutamide Glinides: Nateglinide, Repaglinide OR In COMBINATION with other oral/injectable antidiabetic agents	Combined insulin (once daily) and Oral antidiabetic therapy	Conventional insulin therapy (once or twice daily insulin)	Intensive insulin therapy- (i.e. multiple daily insulin)	Insulin Pump Therapy (CSII)	For example: • Gestational diabetes (see below) • Post MI • Participants in oral/inhaled insulin trials
Patient information: For further information on precautions to take to avoid hypoglycaemia refer to Diabetes UK Diabetes Complications- Hypos and Hypers , Diabetes UK Driving and Diabetes , and DVLA Information for Drivers with Diabetes , updated Nov 2016.								
Recommended Frequency of Testing	Patients with stable glycaemic control	Do not routinely offer SMBG unless fits NICE Type 2 Diabetes guidelines. Only monitor if there is an agreed purpose to test: up to 2-3 times a week at different times. Monitor HbA1c.	The majority of patients will not need to routinely monitor, however, some may require monitoring due to increased risk of hypoglycaemia e.g. Once daily 3 times a week at varying times. Hypoglycaemia most commonly occurs soon after starting sulphonylureas (initial high drug sensitivity). Annual prevalence of severe hypoglycaemia in patients taking sulphonylureas who had good glycaemic control reported as 7%. ³	ONCE daily, at different times of the day. Increase testing if clinically indicated.	Usually TWICE daily 2-3 times a week at different times of the day.	At least FOUR times a day including before each meal and before bedtime. More frequent monitoring will be required where clinically indicated (see below). ³	Usually between FOUR to SIX times a day.	Monitor FOUR - SIX times a day to inform treatment changes, activity, food levels and achieve tighter diabetic control to avoid complications.
	New patients or when control less stable	See above	See above	See above	For Less stable control: ONCE to TWICE a day at varying times.	Monitor more frequently if clinically indicated until the patient is stable: for example, where the required target is not achieved, increase in frequency of hypoglycaemic episodes, during illnesses, before, after and during sport. ³	Monitor FOUR - SIX times a day to inform treatment changes, activity, food levels and achieve tighter diabetic control to avoid complications.	
	Suggested usage of strips in Stable patients	Not routinely required except as part of management plan	Typically about 50 strips (1 box) every 3-4 months if stable.	50 strips every 1.5-2 months.	50 strips every 2-3 months.	120 strips per month 2-3 boxes a month. Supply more if frequency is greater than QDS.	120 -180 strips per month 3-4 boxes a month	120 -180 strips per month 3-4 boxes a month
	Approx. number of boxes per year	Not routinely required	3-4	6	6	24-36	36-48	36-48
DVLA Guidance	Group 1 (cars & motorcycles)	No specific blood glucose monitoring requirements from DVLA.	Check blood glucose within 2 HOURS before driving and EVERY 2 HOURS while driving. More frequent self-monitoring may be required with any greater risk of hypoglycaemia (e.g. physical activity, altered meal routine).					No specific monitoring requirements from DVLA. Notify DVLA if disabling hypoglycaemia occurs or treatment continues for more than 3 months or for Gestational Diabetes, for more than 3 months after delivery.
	Group 2 (lorries/buses)	No specific blood glucose monitoring requirements from DVLA.	Monitor blood glucose AT LEAST TWICE DAILY including days when not driving. Monitor blood glucose no more than 2 hours before the start of 1 st journey and every 2 hours while driving. More frequent self-monitoring may be required with any greater risk of hypoglycaemia (e.g. physical activity, altered meal routine). Use a glucose meter with a memory function that stores at least 3 months of readings.					
PREGNANCY ²	Type 1 diabetes - Pregnant women ²	Test fasting, pre-meal, 1-hour post-meal and bedtime blood glucose levels daily during pregnancy.						
	Type 2 diabetes, pregnant women ²	Diet and exercise therapy or taking oral therapy (with or without diet and exercise therapy) or single-dose intermediate-acting or long-acting insulin: Test fasting and 1-hour post-meal blood glucose levels daily during pregnancy				Multiple daily insulin injection: Test fasting, pre-meal, 1-hour post-meal and bedtime blood glucose levels daily during pregnancy.		
	Gestational diabetes ²	Diet and exercise therapy or taking oral therapy (with or without diet and exercise therapy) or single-dose intermediate-acting or long-acting insulin: Test fasting and 1-hour post-meal blood glucose levels daily during				Multiple daily insulin injection: Test fasting, pre-meal, 1-hour post-meal and bedtime blood glucose levels daily during pregnancy.		



FOR FORMULARY RECOMMENDED BLOOD GLUCOSE TESTING STRIPS, SEE FACTSHEET 17 Formulary Choices: Blood Glucose and Ketone Testing Meters, available [here](#).

Source: Drug Tariff April 2017. Basic Prices for per 50 strips.