North Tees and Hartlepool NHS Foundation Trust | South Tees Hospitals NHS Foundation Trust

NHS South Tees Clinical Commissioning Group | NHS Hartlepool and Stockton-on-Tees Clinical Commissioning Group

Guidelines for Self-Monitoring Blood Glucose in Patients with Diabetes Mellitus

Type 1 diabetes mellitus

Glycaemic control variable with increased risk of hypoglycaemia and hyperglycaemia.

Frequent blood glucose testing required. Test HbA1c every 3-6 months.

Individualised – usual minimum 4 times daily.

Additional testing needed during:

- Illness
- Lifestyle changes
- Pre-conception & pregnancy
- Impaired awareness of or increased frequency of hypoglycaemic episodes
- Exercise
- Driving
- Intensive regimes
- Insulin pump therapy

Test at night if unrecognised hypoglycaemic episodes are suspected.

Teach patients on insulin how to adjust therapy in line with results of home blood glucose monitoring.

Results should be recorded with time and date to provide a cumulative record for day-to-day changes to therapy.

Intensive insulin therapy

Type 2 diabetes mellitus

Glycaemic control usually less erratic / variable than in type 1 diabetes mellitus.

Blood glucose testing will vary according to treatment regimen and target level of glycaemic control. The frequency of monitoring may need to be increased at treatment initiation or when treatment is altered and also during periods of intercurrent illness or lifestyle changes.
If corticosteroids are co-prescribed - test at midday, before evening meal and two hours after.

Diet and exercise	Metformin, pioglitazone Gliptins Incretin mimetics, SGLT2 inhibitors	Sulphonylureas Nateglinide Repaglinide Alone or in combination with oral medication or incretin mimetics	Basal insulin plus oral medication	Twice daily pre-mixed insulin
HbA1c is the outcome measure. Routine blood glucose testing not recommended. Acute prescription only at annual review if needed Short-term testing *may* be required: -during illness -if corticosteroids are co- prescribed (test at midday, before evening meal and two hours after evening meal) -when therapy is changed		Increased risk of hypoglycaemic episodes compared with other non-insulin therapies. Test 2-3 times per week at different times of day (e.g. before breakfast and once before another meal). Individual assessment required. Increase frequency of testing during periods of prolonged concentration. Follow DVLA guidance for testing when driving.	Fasting glucose should be tested once a day before breakfast to titrate basal insulin plus once per day at different times to identify periods of hypo and hyperglycaemia.	Test twice a day at various times to include pre and post-prandial and pre-bedtime blood glucose monitoring. Always test before driving

Once blood glucose is within target range and very stable, testing frequency can sometimes be reduced to two to three times per week , times as for sulphonylureas.

Pre-conception care and Pregnancy: Testing required:

Advise women who need intensification of hypoglycaemic therapy to increase the frequency of self-monitoring to include fasting and a mixture of pre and post prandial levels.

Advice for People using insulin:
Carry your glucose meter and blood glucose strips with you. Check blood glucose before driving (even on short journeys) and test regularly (every 2 hours) on long journeys. DVLA guidance

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Guidance Notes

Self-monitoring of Blood Glucose (SMBG)
Routine SMBG **is recommended** for **all adult patients** with **type 1 diabetes**, with testing at least four times per day including before each meal and at bedtime. Children & young people should be advised to test at least 5 times per day. More frequent testing (up to 10 times per day) may be needed: when there is a legal requirement (e.g. before & during driving); before, during & after pregnancy; before, during or after sport; during illness; for problematic hypoglycaemia, and; when HBA1c targets are not met. Some people may need to test more than 10 times per day because of: high-risk activities or occupations; travel; long-distance driving; impaired awareness of hypoglycaemia.

Routine SMBG **is NOT recommended** for **adults** with **type 2 diabetes** not treated with insulin, unless: 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**, or is **planning to become pregnant**. Short-term SMBG should be *considered*: when starting treatment with corticosteroids, and; to confirm suspected hypoglycaemia. All adults with type 2 diabetes who self-monitor blood glucose levels should have a structured assessment at least once-a-year. The following should be assessed: equipment used; self-monitoring skills; quality and frequency of testing; knowledge of how to interpret results and action to take; impact on quality of life, and; continued personal benefit.
The International Diabetes Federation recommends that: SMBG should be used only when individuals with diabetes (and/or their care-givers) and/or their healthcare providers have the knowledge, skills and willingness to incorporate SMBG monitoring and therapy adjustment into their diabetes care plan in order to attain agreed treatment goals. Unnecessary and unnecessarily frequent blood testing can impair quality of life, lead to anxiety and consume resources that could be more effectively deployed to support lifestyle change and other interventions.

DRIVING: The DVLA **requires** drivers of buses and lorries who use insulin or take oral medicines carrying risk of hypoglycaemia to test blood glucose levels at least twice every day (even when not driving), and to test no more than 2 hours before the start of the first journey and at least every 2 hours while driving. The DVLA **recommends** the same precautions for drivers of cars and motorbikes who use insulin. The DVLA **notes** that it is appropriate to offer SMBG at times relevant to driving to enable the detection of hypoglycaemia by drivers of cars and motorbikes who take oral medicines carrying risk of hypoglycaemia. See DVLA guidance for details.

Blood glucose targets
Adults with type 1 diabetes should aim for 5–7 mmol/litre on waking and 4–7 mmol/litre before meals at other times of the day. Non-pregnant adults who choose to test after meals should aim for 5–9 mmol/litre at least 90 minutes after eating. Bedtime targets should be individualized, taking account of timing of last meal; related insulin dose, and; recommended fasting level on waking. Targets for children differ. Targets may need to be individualized for older adults, people with certain co-morbitities, during pregnancy and for people engaged in certain high risk activities. **NICE have not recommended targets for instantaneous blood glucose levels in type 2 diabetes.**

HbA1c
HbA1c is the most appropriate measure of long-term blood glucose control in both type 1 and type 2 diabetes. Patients should be involved in decisions about their individual HbA1c target. Individual targets should take account of factors such as the person's daily activities, aspirations, likelihood of complications, comorbidities, occupation and history of hypoglycaemia. Adults with type 1 diabetes, and adults with type 2 diabetes treated with lifestyle and diet +/- a single drug not associated with hypoglycaemia, should be supported to aim for 48mmol/mol (6.5%). People with type 2 diabetes taking drugs associated with hypoglycaemia or requiring more than one drug should be supported to aim for 53mmol/mol. Relaxed targets should be considered for people with type 2 diabetes who: are unlikely to achieve longer-term benefits; at high risk of the consequences of hypoglycaemia, or; have significant comorbidities.

Testing Strips & Lancets Quantity Guide

	Quantities / Packs		
Patients with	Testing Strips-packs of 50	LANCETS – packs of 100	Quantities shown are based on typical testing routines. Individual requirements will vary & depend on recommended testing frequency. Expiry dates should be taken into account. Both strips and lancets are for single-use and equal quantities should be needed/provided. Continuation and frequency of use should be evaluated at each diabetes review. Consider issuing as acute or automatic rather than as repeat prescriptions.
Type 1 diabetes & Type 2 diabetes treated with intensive insulin therapy	2-3 packs every month	1 to 1½ packs every month	
Type 2 diabetes treated with basal or pre-mixed insulin	1 pack every month initially	1 every two months	
Type 2 diabetes at risk of hypoglycaemia due to insulin secretagogues	1 pack every three months	1 pack every six months	

Blood Glucose Meters and testing strips
The Teesrecommended formulary meters and testing strips are:

- **Contour Black meter/contour test strip, Accu-check Performa Nano meter/Performa test strip. Restricted criteria:Contour Next, Freestyle Light,Accucheck Aviva, GlucoRx HCT and Ketone or Glucomen Areo 2K (see separate guidance document)**

Patients should be encouraged to use up in-date test strips before ordering supplies for new meters.
Insulin pen needles: Needles of choice across Tees are GlucoRx FinePoint and BBraun Omnican Fine (both £5.95 for 100).

Sources: NICE NG17 Type 1 diabetes in adults; NG18 Type 1 & Type 2 diabetes in children & young people; NG 28 Type 2 diabetes; DVLA