

Guidelines for Home Glucose Monitoring for Adults with Type 1 & 2 Diabetes Including Guidance on Choice of Meters, Strips and Lancets

These guidelines have been written in accordance with the North East Essex Diabetes Service (NEEDS). The National Service Framework for Diabetes, Diabetes UK and NICE guidelines.

Introduction

Over the years we have come to offer most people with type 2 diabetes self-monitoring, thinking it was cost effective and beneficial.

This unfortunately is not the case. There is good evidence now that testing in established¹ or newly diagnosed² type 2 patients does not improve glycaemic control and may actually be harmful by increasing depression scores². This of course also makes self-monitoring not cost effective for patients with non-insulin treated type 2 diabetes³. Indeed patients themselves are uncertain of the value of testing, with the main reasons for continuing being habit and reassurance rather than altering behaviour⁴.

Remember also that many patients test 3 or 4 times per day, without making any adjustment to their therapy (particularly if they are on oral agents only). Some because they think we (as health carers) want them to⁴. For these patients it may not be necessary to test at all.

Our new guideline recommends less testing, which in my opinion is entirely clinically appropriate. We do spend a lot on sticks, which we do need to curtail. The good news is that all the savings we make will be re-invested into medicines for people with diabetes. There is no intention to cut the budget for people with diabetes.

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Background

People with poor glucose control are more likely to suffer from complications of diabetes, such as ischaemic heart disease and microvascular disorders, for example renal and eye disease. They are also more likely to die from a diabetes related cause. The findings from the United Kingdom Prospective Diabetes Study (UKPDS)⁵ indicate that any reduction in a person's average haemoglobin A1c (HbA1c) level is likely to reduce the risk of non-acute complications. Target for the prevention of microvascular complications in Type 1 diabetics is $\leq 48\text{mmol/mol}$ (6.5%)^{7,8}. For Type 2 diabetics the general target is 48mmol/mol (6.5%) and 53mmol/mol (7.0%) if on a drug associated with hypoglycaemia.⁶

The NICE guidelines recommend that people should have access to home blood glucose monitoring based on individual clinical need, informed consent and not on

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ability to pay. Home monitoring is essential in the context of diabetes education for self-management in order to enable the person to make appropriate treatment or lifestyle choices (Diabetes UK 2006). Clinicians should ensure that patients monitoring their blood glucose levels are clear about the purpose of the monitoring, how results should be interpreted, and what action to take in response to results.

Objective

The purpose of monitoring blood glucose levels is to act on the results to provide the best possible care and outcomes (North East Essex Diabetes Service 2017).

These guidelines are also intended to assist healthcare professionals in the selection of appropriate blood glucose meters, testing strips and lancets for patients to self-monitor their blood glucose levels. The need for a meter for newly diagnosed patients with diabetes will be assessed by a healthcare professional and if required a suitable meter will be supplied to the patient. These meters will be provided free of charge from GP surgeries or diabetic clinics. There should be no need for a patient to purchase a meter and patients should be dissuaded from doing so without consulting their specialist first. Patients who purchase a meter for use outside the recommendations made in these guidelines should **not** be prescribed strips and lancets in primary care.

Aim

For people with diabetes, to monitor their diabetes in the most appropriate way in addition to regular HbA_{1c} measurement (3-6monthly).

People with diabetes should have access to home blood glucose monitoring as necessary, receive the most appropriate meter and education for effective and appropriate use free of charge.

People with diabetes will receive support to optimise their blood glucose control, minimising the risk of long-term vascular complications in partnership with the health care provider. In type 2 diabetics (except in those patients receiving sulfonylureas) testing should only be used within the context of a care package supported by structured education with regular reviews.

Quality Control

To ensure that the readings patients present to you are a reasonable reflection of their glycaemic control when using their own meter: The patient

- Must be educated on quality control of their meter
- Patients should Quality Control (QC) their meter as recommended by the meter company and record results (preferably on the meter) for reference. It is the responsibility of the patient to ensure that the meter they are using is working correctly
- The patient should be aware that the QC solutions can be obtained free of charge from the company's customer care line.

Recording results

Patients are to be advised to use their meter memory to store results and bring the meter along to their appointments for review. This is important for all patients holding a drivers licence as up to three months readings are required at review.

Driving

Detailed information can be found on the DVLA website <https://www.gov.uk/guidance/diabetes-mellitus-assessing-fitness-to-drive>

Group 1 Drivers (cars/motorcycles) on **insulin** are advised to test their blood glucose levels no more than 2 hours before the start of the first journey and every 2 hours during the journey. More frequent self-monitoring may be required with any greater risk of hypoglycaemia (physical activity, altered meal routine).

Group 1 drivers taking **sulfonylureas and glinides** the frequency of testing depends upon the clinical context – the greatest risk of hypoglycaemia with sulfonylureas is in the first three months of treatment therefore people who are just starting treatment, experiencing hypoglycaemia, or have reduced awareness are likely to need to test more frequently. For other patients the DVLA advises that it may be appropriate to monitor blood glucose regularly and at times relevant to driving to enable the detection of hypoglycaemia.

Group 2 Drivers (lorries/buses) treated with **insulin** are advised to have regular blood glucose testing – at least twice daily including on days when not driving and to test their blood glucose levels no more than 2 hours before the start of the first journey and every 2 hours during the journey. More frequent self-monitoring may be required with any greater risk of hypoglycaemia (physical activity, altered meal routine), in which case a bus or lorry driver may be licensed if they:

- use a glucose meter with memory functions to ensure 3 months of readings will be available for assessment

Group 2 Drivers treated with **sulfonylureas and glinides** are advised to have regular self-monitoring of blood glucose – at least twice daily and at times relevant to driving e.g. no more than 2 hours before the start of the first journey and every 2 hours while driving.

Drivers must also use a blood glucose meter with a memory function **with no delete facility** which records blood glucose levels as they will be required to have three months of blood glucose readings available for inspection at an annual examination by a consultant diabetologist.

Remember to discuss hypoglycaemia awareness, severe hypoglycaemia and licence withdrawal, length of time to full recovery following a mild hypo before driving (45 minutes), and the threshold for safe driving (>5 mmol/l).

Recommendations for Home Blood Glucose Monitoring

Diabetes Type	Treatment Group	Monitoring Regime
Type 1	All people with type 1 diabetes	<ul style="list-style-type: none"> • Blood glucose monitoring should be seen as an integral part of treatment. • People with type 1 diabetes should be trained to monitor blood glucose and alter treatment appropriately. • The amount of tests performed should be negotiated between the health care professional and patient to optimise control and prevent acute complications.
Diabetes in pregnancy	All women with diabetes in pregnancy and those planning pregnancy	<ul style="list-style-type: none"> • Blood glucose monitoring essential. • The amount of tests as recommended by the joint diabetes/antenatal team.
Type 2	Intensive insulin therapy/ titration of insulin	<ul style="list-style-type: none"> • As with type 1 diabetes, monitoring should be according to the individual need of the patient to optimise control and prevent acute complications.
Type 2	Insulin & oral therapy	<ul style="list-style-type: none"> • Pre-meal glucose should be tested at least once per day (varied times) during titration of insulin. In addition patients should test one other time to build a profile. • Patients on twice daily insulins should monitor once or twice daily at various times to include pre- and post-meal and pre-bedtime blood glucose measurements until stable, and then reduce to once daily if necessary. • Patients who have unstable glycaemia should test at least twice a day varying the times.
Type 2	Diet & exercise	<ul style="list-style-type: none"> • Blood glucose monitoring is not required. • HbA1c is the real outcome measure and should be monitored 3-6 monthly. • If patients choose to perform self-monitoring as a method of monitoring life style changes they should be given the most appropriate meter and advised on appropriate use of testing and reporting. If no change of lifestyle then testing should not be encouraged. • Blood glucose monitoring is required in special circumstances such as <u>periods of illness</u>.
Type 2	Metformin (+/- Glitazones)	<ul style="list-style-type: none"> • As for diet & exercise. • HbA1c remains the real outcome. • During titration of medication, blood glucose should be recorded once per day at varying times of the day.
Type 2	Sulfonylurea alone or in combination with other oral hypoglycaemic agents	<ul style="list-style-type: none"> • Routine testing is not required. • Patients with evidence of hypoglycaemic episodes should be taught how to monitor blood glucose using the most appropriate meter, interpretation of results and routinely test at least 3 times per week to assess medication or lifestyle change. • Testing should be undertaken at different times of the day to ensure hypoglycaemia is identified.

Type 2	Incretins SGLT-2 (Gliflozins)	• There is no evidence to support blood glucose monitoring unless on sulfonylurea.
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Recommendations for Home Blood Glucose Monitoring

Diabetes Type	Treatment Group	Monitoring Regime
Special circumstances	Driving Illness Changes of treatment Steroid therapy	<ul style="list-style-type: none"> • Patients on treatment (insulin and some oral medication) must be made aware of the regulations of the DVLA. • Patients should be made aware of the “sick day rule” guidelines and be aware that they should test frequently. • Various tests should be performed until stabilisation of glycaemia. • Patients should be advised to increase the amount of testing during the day to adjust diabetic treatment.

Table adapted from: - Owen. D (2004) A multidisciplinary consensus: Diabetes in Primary Care

This is a guide - all patients should be treated as individual and be set targets according to their circumstances and needs.

References

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Choice of meter

The aim of this policy is to support the use of the most cost effective method of blood glucose monitoring whilst meeting differing patient needs.

Type 1 Diabetes:

Meter should be chosen depending on the need and use to optimise control.

If no special features are required, patients should be offered a basic meter from the list of Type 2 (Table 2).

Table 1: Meters suitable for type 1 diabetes with special clinical requirements

Meter	Manufacturer	Testing Strips	Drug Tariff cost for 50 strips (Sept 2017)	Memory	Special Situations	Other features
GlucorX HCT	GlucorX	GlucorX HCT GlucorX HCT Ketone	£9.95 £9.95 x 10	1000	Type 1 DM pregnancy Ketone testing	Ketone warning function, Meal markers, Day averages and Alarms
CareSens Dual	Spirit Healthcare	CareSens Pro blood Glucose KetoSens blood Ketone	£9.95 £9.95 x 10	1000	Ketone testing	Bluetooth functionality Tagging of pre, post meal & fasting levels
Glucomen Aero 2K	Glucomen	Glucomen Aero Sensor Glucomen Aero B-ketone Sensor	£9.95 £9.95 x 10	730	Type 1 DM pregnancy Ketone Testing	Up to six settable acoustic alarms (3 for glucose, 3 for β- ketone measurements)
Accu-Chek Aviva Expert	Roche	Accu-Chek Aviva	£16.09	1000	Type 1 DM & Patients who Carb Count	Hand set to Insulin Pump Insulin Bolus advisor
FreeStyle Optium Neo and Ketone Monitoring System	Abbott	Freestyle Optium blood glucose Freestyle Optium B-ketone	£16.00 £21.26 x 10	1000	Type 1 DM pregnancy	Ketone Testing Insulin Dose Guide Trend Indicator

Type 2 Diabetes:

For non-complex patients, who are not pregnant and are not being managed by Diabetes Specialist Services, North East Essex CCG approves the monitors and strips listed below. Patients should not be “switched” without their involvement and discussion. The opportunity to review strips may present at diabetes review, or recall for review before the next prescription is due. Patients should use all their current test strips before starting to use new meters and strips to avoid waste.

Further information on diabetes can be found at <http://www.diabetes.org.uk>

Table 2 Meters suitable for non-complex diabetic patients

Meter	Manufacturer	Testing Strips	Drug Tariff cost for 50 strips (August 2015)	Memory	Comments
TEE2	Spirit Healthcare	TEE2	£7.75	500	1st choice for normal routine testing in type 2 diabetics
WaveSense JAZZ*	AgaMatrix	WaveSense JAZZ	£9.87	1865	Meal time tagging Hyper/Hypo warning –patient specific Alarms
One Touch select Plus*	LifeScan UK	One Touch Select Plus	£9.99	500	Suitable for use in residential and care homes and in type 1 diabetics who are not carb counting
Glucomen Areo	Glucomen	Glucomen Areo Sensor	£9.95	730	Suitable for gestational women due to haematocrit range (10-70%) and adults whose lifestyle would benefit from QuickLink technology (ease of data transfer to mobile devices)
Glucorx Nexus Voice	Glucorx	Glucorx Nexus	£9.95	450	Restricted for visual impaired patients

All meters:

- Are auto coded and eliminate the need to calibrate strips with the monitor.
- Are ISO15197:2013 compliant and does not allow deletion of results.

Choice of lancets and lancing devices

Lancets & lancing devices supplied with the meters may not be supported by NEE CCG. Lancets with a higher gauge are generally less painful but may not provide enough blood for testing. Please ensure the quantities of the lancets are in line with the frequency of testing and match quantities with blood glucose test strips.

Please use CCG recommended lancet brand and supply a universal lancing device where required.

North East Essex CCG recommended lancets

Remind patients it is not essential to have the same lancets as that provided with their meter.					
Patients testing <4 X daily					
Manufacturer	Lancet	Size	Pack size	cost	Compatible
HTL-STREFA S.A.	Droplet Lancets	0.31mm/30 Gauge	100	£2.19	◆Universal fit
	Droplet Lancets	0.36mm/28 Gauge	100	£2.19	
Palmdoc LTD	Palmdoc iCare Advanced Lancets	0.38mm/30 Gauge	100	£2.85	
Spirit Healthcare	CareSens Lancets	0.31mm/30 Gauge	100	£2.95	
	CareSens Lancets	0.36mm/28 Gauge	100	£2.95	
Patients testing ≥4 X daily					
Palmdoc LTD	Palmdoc iCare Advanced Lancets	0.38mm/30 Gauge	200	£4.45	◆Universal fit
Apollo Medical technologies LTD	Apollo Twist Lancets	0.36mm/28 Gauge	200	£4.50	
Ypsomed	Mylife Lancets multicolour	0.3mm/30G	200	£5.50	◆Universal fit; Child ≤12 yrs only
Safety Lancets Safety Lancets are for the benefit of the healthcare worker and should not be routinely prescribed on FP10s but provided by the employer.					

◆Lancets will not fit universal lancing devices provided by Roche Multiclix and Softclic Plus, LifeScan OneTouch Delica. Patients using these lancing devices will need to attend the surgery for a universal lancing device.