

# **Blood Glucose Monitoring in Adults with Diabetes**

## **Recommended guidelines for healthcare professionals**

You should offer self-monitoring of plasma glucose to a person newly diagnosed with Type 2 diabetes only as an integral part of their self-management education. Discuss its purpose and agree how it should be interpreted and acted upon.

### ***Self-monitoring of plasma glucose should be available to people with diabetes:***

- on insulin treatment or taking sulphonylureas or glinide:
  - in order to prevent, detect and manage hypoglycaemia
  - to ensure safety during activities; particularly driving (see appendix 1).
- to assess changes in glucose control resulting from medications and lifestyle changes
- to monitor changes during illness
- to prepare for surgery or pregnancy

### ***During the patients' annual health check or more frequently if appropriate, assess:***

- their self-monitoring skills
- the quality and appropriate frequency of testing
- the use made of the results obtained
- the impact on quality of life
- the continued benefit
- the equipment used
- how many strips they are ordering in relation to their testing

If self-monitoring is appropriate but blood glucose monitoring is unacceptable to the individual, discuss the use of urine glucose monitoring. Please remember however, that this will not detect hypoglycaemia.

## **Blood glucose monitoring timing and targets:**

Targets will differ for individual patients with diabetes, but the following is the recommended guide for most patients:

Fasting:	5-7mmol/L
Pre-lunch or Pre-teatime	4 -7mmol/L
Post-meal (1 to 2 hours)	< 10mmol/L
Bedtime	6-10mmol/L

## **Teaching blood glucose testing**

Advise patients to:

- warm their hands first – if they are really cold it is harder to draw blood, and finger-pricking will be more painful
- wash their hands with soap and water; they should avoid wet wipes as they contain glycerine that could alter the result
- prick the side of a finger, avoiding the forefinger and thumb - not the middle, or too close to a nail, because this will be painful
- use a different finger each time and a different part – this will be less painful

hold their hand down towards the ground if they are unable to get enough blood; this should make more blood flow to the fingers

## Self-monitoring regimes

The regime you suggest to your patient will be dependent on their treatment and personal circumstances and therefore, patients should be advised individually. The following is a guide:

<b>Diabetes management</b>	<b>Recommended regime</b>	<b>Recommended testing strips to prescribe (28 day prescribing)</b>
Newly diagnosed with type 2 diabetes or managed by diet or metformin and/or glitazone, DPP-4, GLP-1	Once or twice a day while assessing the response to lifestyle or treatment changes. No need to continue monitoring if good glycaemic control has been achieved.	<b>50 strips</b> <i>Advise patients they will not need to order every month</i>
Type 2 diabetes managed with a sulphonylurea or glinide SMBG with appropriate structured education should be available to people receiving a sulphonylurea or glinide treatment to identify hypoglycaemic episodes. Patients must be advised about what is <b>appropriate blood glucose monitoring</b> for their own particular requirements	Patients who have been initiated on these drugs or had a dose change, unstable blood sugars, acutely unwell etc need to monitor frequently i.e. at least once a day at varying times. Patients who are stable i.e. do not get low blood sugars should still test periodically for example twice weekly but at varying times as indicated above.	<b>50 strips</b> <i>Advise patients they will not need to order every month</i>
Type 2 diabetes managed with once daily insulin regime	Once daily – varying the time between fasting, pre-meal and bedtime	<b>50 strips</b> <i>Advise patients they will not need to order every month</i>
Type 2 diabetes managed with twice daily insulin regime	Twice daily – alternate between fasting and pre-evening meal on one day and pre-lunch and pre-bedtime the next day	<b>2 x 50 strips</b> <i>Advise patients they will not need to order every month</i>
Basal bolus, insulin pump	Four times daily Morning fasting, before meals and before bed	<b>3 x 50 strips</b> <i>Advise patients to check personal stocks of strips and not to order if they have plenty</i>
Basal bolus, insulin pump, new insulin regime, erratic lifestyle, poor control, high risk of hypoglycaemia, pregnancy	Seven or more times daily Morning fasting, before meals, two hours after meals and before bed	<b>4 x 50 strips</b> <i>Advise patients to check personal stocks of strips and not to order if they have plenty</i>

**NB:** Testing will be increased in times of illness, changes in therapy, changes in routine, times of poor control and when risk of hypoglycaemia. Emphasise need to test before and during driving.

### **Blood glucose meters**

As test strips are very expensive, Northamptonshire Teaching Primary Care Trust recommends CARESENS meters to reduce costs. It is appropriate to offer a CareSens meter to all patients which are new to glucose monitoring. The company will provide each practice with training and free meters. They offer patients 24 hour support. It maybe, that an alternative meter is necessary depending upon the clinical situation (for example a speaking meter for those that have visual impairment or a meter which can “link” with an insulin pump). Patients with Type 1 Diabetes may also require a meter to allow testing for blood ketones. Therefore, if an alternative meter to CareSens is recommended by either the Diabetes MDT or Secondary Care, the reason for that decision should be clearly relayed to Primary Care It is not the intention that CareSens is the only meter available to patients. It is however, acceptable to discuss with patients whether they wish to change over to a CareSens meter.

### **Personal targets**

You should agree individual targets for blood glucose and HbA1c with each patient using a personal plan. Discuss the increased risk of hypoglycaemia in people taking insulin or a sulphonylurea. Advise patients on sulphonylureas or insulin to aim to keep the fasting BG above 5 mmol/L to help avoid night time hypoglycaemia.

<b>Personal plan for measuring and monitoring blood glucose</b>
HbA1c Target:
Blood Glucose Targets:
Blood Glucose monitoring plan:

## **Appendix 1: Guidance with respect to monitoring blood glucose and driving for patients with diabetes:**

### **Group 1 (e.g. car) Entitlement on Insulin:**

- Must have hypoglycaemia awareness
- Must not have had more than one hypoglycaemic episode, requiring the assistance of another person, in the preceding 12 months
  - Undertakes appropriate glucose monitoring , i.e. they always test beforehand and every two hours on long journeys.

### **Group 2 (e.g. HGV or bus) Entitlement on Insulin:**

- No episodes of hypoglycaemia requiring the assistance of another person in the preceding 12 months
- Must have full hypoglycaemia awareness
- Regularly monitors blood glucose at least twice daily and at times relevant to driving
- Uses a meter with a memory function to record and demonstrate blood glucose levels (which can be examined by a consultant at the annual review)
- Demonstrates an understanding of the risks of hypoglycaemia

### **Group 1 (e.g. car) Entitlement on Sulphonylureas + Glinides:**

- No more than 1 episode of hypoglycaemia requiring the assistance of another person in preceding 12 months
  - **May be** appropriate to monitor blood glucose regularly and at times relevant to driving. Patients who have been recently initiated on these drugs or had a dose change, unstable blood sugars, acutely unwell etc need to monitor frequently i.e. at least once a day at varying times. Patients who are stable i.e. do not get low blood sugars, should still test periodically for example twice weekly but at varying times. This may be sufficient to ensure control is satisfactory for driving. It may, however, need to be more frequent and at times relevant to driving if glucose levels are erratic and there is a tendency to low glucose levels.

### **Group 2 (e.g. bus or HGV) Entitlement on Sulphonylurea + Glinides**

- No episodes of hypoglycaemia requiring the assistance of another person in the preceding 12 months
- Must have full hypoglycaemia awareness
- Regularly monitors blood glucose at least twice daily and at times relevant to driving
- Demonstrates an understanding of the risks of hypoglycaemia

## **References**

Diabetes UK. (2008). *Self-blood glucose testing*. Available from:

[http://www.diabetes.org.uk/Guide-to-diabetes/Monitoring/Blood\\_glucose/Self\\_blood\\_glucose\\_testing/](http://www.diabetes.org.uk/Guide-to-diabetes/Monitoring/Blood_glucose/Self_blood_glucose_testing/)

National Institute for Health and Clinical Excellence (2010). *Type 2 diabetes: the management of type 2 diabetes (NICE guideline)*. Available from: [www.nice.org.uk](http://www.nice.org.uk)

DVLA (2011). *At a glance guide to the current medical standards of fitness to drive*. Available at: <http://www.dft.gov.uk/dvla/medical/ataglance>