

## DIABETES – BLOOD GLUCOSE MONITORING AT HOME (ADULTS)

### Clinical Guideline

#### Type 2 Diabetes

**Self-monitoring of blood glucose (SMBG) should be considered but not be routinely offered for adults with type 2 diabetes unless:**

The person is on insulin or

There is evidence of hypoglycaemic episodes or

The person is on oral medication that may increase their risk of hypoglycaemia or

The person is pregnant, or is planning to become pregnant.

The DVLA "[At a glance guide to the current medical standards of fitness to drive](#)" should be taken into account when offering SMBG for adults with type 2 diabetes.

**The following criteria should be followed for patients with type 2 diabetes:**

- 1 SMBG should be considered for appropriate newly diagnosed patients as some may need to monitor frequently initially in order to provide them with information in relation to their activities and the effect of dietary measures and treatment prescribed. The need for continued SMBG should be reviewed regularly.
- 2 Patients taking sulfonylureas, or other agents that may increase the risk of hypoglycaemia should have their monitoring frequency discussed with the clinician. Testing frequency should be determined on an individual patient basis. This applies particularly to patients on longer acting agents.
- 3 Patients should monitor their blood glucose levels more frequently in the following circumstances:
  - Inter-current illnesses
  - Change in oral hypoglycaemic treatment
  - Exercise
  - Carbohydrate counting
  - If there are difficulties in venesection or if glycosylated haemoglobin is unreliable\*.
- 4 Consider short term SMBG in adults with type 2 diabetes (and review treatment as necessary):
  - When starting treatment with oral or IV corticosteroids or
  - To confirm suspected hypoglycaemia.

**\*Glycosylated haemoglobin may be unreliable in the following situations:**

- (i) Patients with anaemia;
- (ii) Patients with polycythaemia;
- (iii) Patients with haemoglobinopathies;
- (iv) Patients in whom venesection is not possible

If adults with type 2 diabetes are self-monitoring their blood glucose levels, then a structured assessment needs to be undertaken at least annually. The assessment should include:

- The person's self-monitoring skills
- The quality and frequency of testing
- Checking the person knows how to interpret the blood glucose results and what action to take
- The impact on the person's quality of life
- The continued benefit to the person
- The equipment used.

### **Type 1 Diabetes (and type 2 diabetes using insulin therapy)**

Recommend SMBG for all adults with type 1 diabetes.

**For patients who are stable, blood glucose should be tested at least four times a day (pre-meals and pre-bed) on two days per week.**

Patients may need to adapt the frequency of their blood glucose testing due to numerous factors and should be supported to test at least 4 times a day, and up to 10 times a day if any of the following apply:

1. Desired target HbA1c level is not achieved.
2. Frequency of hypoglycaemic episodes increases
3. There is a legal requirement to do so (such as in line with DVLA guidance)
4. Inter-current illnesses
2. Carbohydrate counting
3. Pregnancy (including planning pregnancy, during pregnancy and while breastfeeding)
4. Before & during driving
5. Before during & after exercise
6. Those using insulin pumps.
7. If there is a need to know blood glucose levels >4 times a day for other reasons (e.g. impaired awareness of hypoglycaemia, high risk activities)

Consider ketone monitoring as part of sick day rules for adults with type 1 diabetes, to facilitate self-management of an episode of hyperglycaemia.

**Access to testing strips MUST NOT be restricted for patients using insulin or for paediatric patients (excluded from this guideline)**

Diabetes – blood glucose monitoring at home (adults) – clinical guideline, v4 Principal author: Prof D Bowen-Jones & Dr KS Leong (WUTH), Mrs V Vincent (MLCSU)

Checked by L Sahlman, Practice Pharmacist (MLCSU)

Acknowledgements: Greater East Midlands Commissioning Support Unit and Eastern Cheshire, South Cheshire & Vale Royal Clinical Commissioning Group

Approved by Wirral Clinical Guidelines Team: June 2016

Review by: 3 years

## DVLA Guidance

When reviewing SMBG please be aware of the DVLA "[At a glance guide to the current medical standards of fitness to drive](#)". All detail regarding any legal requirements can be found on the DVLA website.

## Blood Glucose Meter Expenditure

A wide variety of blood glucose meters are currently available with test strips ranging in price from less than £10 to £15 per pack of 50. Current expenditure (financial year 2015/16 data) in Wirral is over £883K; approximately 80% of these testing strips are the higher cost strips.

**By moving to a position where 80% of prescriptions are for the lower cost test strips, and reserving more specialist meters for those situations in which they are clearly clinically indicated, there is potential to make cost efficiencies of at least £100K per annum.**

## ISO Quality Standards

**ISO** (International Organisation for Standardisation) 15197:2013 (E) describes the requirements for blood glucose monitoring systems using capillary blood (ISO, 2013). All capillary blood glucose monitoring strips must meet the ISO standards by 2016.

The standards cover the following areas:

- Ease of operation, maintenance, cleaning. Ensuring the visual display is clear and there is no likelihood of misinterpretation of the result.
- Safety and reliability (e.g. no risk of electric shocks to the user, resistance to shock, vibration and heat).
- Precision, accuracy and influence by abnormalities in haematocrit and other interferences.
- User performance evaluation, including ease of understanding instructions.

All meters featured on these guidelines comply with the ISO standards 2013 (independent or manufacturer's data).

## **Selection Criteria**

The low cost blood glucose meters were evaluated by the Diabetic Specialist Nurses at Wirral University Teaching Hospital (WUTH). The guidelines were consulted on by Medicines Management QIPP, GPs through Prescribing Group Meetings, Practice Nurses, Diabetes QIPP and WUTH pharmacy. The lists below are not exhaustive as other meters which use low cost (<£10 per 50) strips are available (see Drug Tariff or BNF), however Practice Nurses should familiarize themselves with a selection of meters (that are ISO compliant) and make them available for demonstration and supply to patients.

Patients who have been provided with one of the meters listed (or another meter using low cost strips) who subsequently choose to purchase or request a different meter in excess of their individual clinical need, should be advised that the CCG does not support provision of higher cost test strips (in these instances).

## **Expiry dates of test strips**

The minimum expiry date for these lower cost blood glucose test strips is three months from the time the pot of test strips is opened. For those testing on average of twice a day this means that the supply of test strips will be exhausted before the three month period is over. For those that test infrequently (for example once or twice a week) then test strips with an expiry date of at least six months from the time the pot is opened might be a more cost effective option.

To extend the expiry date of useable strips, a number of manufacturers have divided their strips in smaller pack sizes (e.g. 2 x 25 strips). Therefore if the pots of strips are opened consecutively this extends the total time the supply of 50 strips can be used. For example, 2 x 25 strips with an expiry date of 3 months at the time of opening if used consecutively can last in total a maximum of 6 months.

## Recommendations

**80% of diabetic patients should use low cost blood glucose meters. The formulary choices for low cost meters are listed below:**





| Meter Name                                    | Accu-chek Active  | Accu-chek Performa Nano   | Contour TS  | Glucomen Areo   | GlucRx Nexus  | GlucRx Nexus Mini   |
|---|---|---|---|---|---|---|
|   |  |  |  |  |  |  |
| Testing Strips                                | Active testing strips<br>£9.95/ 50  | Accu-chek Performa Nano<br>£9.95/50   | Contour TS testing strips<br>£9.50/50   | Glucomen Areo sensor<br>£9.95/50  | GlucRx Nexus<br>£9.95 / 50  |   |
| Range and Test Time                           | 0.6-33.3mmol/l<br>5 seconds   | 0.6-33.3mmol/l<br>5 seconds   | 0.6-33.3mmol/l<br>5 seconds   | 1.1-33.3mmol/l<br>5 seconds   | 1.1-33.3mmol/l<br>5 seconds   |   |
| Shelf life once opened                        | Date on container   | Date on container   | Date on container   | 9 months  | 6 months (but comes as 2x25 strips)   |   |
| Special features                              | Strip date expiry warning   | Hypoglycaemia indicator   | No coding required  | Glow in the dark display  | Ketone warning  |   |
| Memory  | 500   | 500   | 250   | 730   | 1000  |   |
| Compatible Lancets and Lancing Device         | Accu-Chek softclix finger pricker with softclix lancet                            | Accu-Chek fastclix finger pricker   | Microlet 2 device and lancets   | Glucject dual plus device and lancets   | GlucRx Lancing Device and Lancets   |   |
| Company / Customer Care Line                  | Roche Careline<br>0800 701 000  | Roche Careline<br>0800 701 000  | Bayer Diagnosis<br>0845 600 6030  | Glucomen<br>0800 243667   | Dime<br>01483 755 133   |   |
| Quality Control solution shelf life once open | 3 months  | 3 months  | 6 months  | 3 months  | 3 months  |   |

**Consumables** (e.g. batteries, Quality Control solution, USB cables etc.) are available free of charge from the Company Customer Care lines. Software download is Available for all listed meters. When changing a patient's meter, please help reduce waste where possible by ensuring test strips for the previous meter are used before ordering the new strips.

**The following patient groups may be less suitable for a low cost meter. However, consideration must be given to trying a low cost meter first line, before using the meters below. It is expected that only 20% of diabetic patients would be suitable for a higher cost meter/strips.**

| Patient group   | Reason for exclusion or special consideration  |
|---|--|
| Children/adolescents aged less than 18 years  | Meter choice should be agreed on an individual patient basis with the paediatric specialist nurse. These patients are excluded from this guideline.  |
| Those with existing or gestational diabetes during pregnancy  | The majority of these patients are recommended to use Contour XT meters (with the Contour Next test strips).   |
| Those using insulin pumps or carbohydrate counting  | May be using specific meters that provide dosing advice on insulin requirements. For Bolus Advisor Systems, Insulin Calculators and/or Carbohydrate Counting.<br><br>The Aviva strip is used for the Accu-Chek Aviva Expert System or the FreeStyle Lite test strip used for the FreeStyle InsuLinx. |
| Those patients who need to test their blood glucose as they hold a group 2 driving licence              | Meters with a sufficient memory are required. However, these can include the lower cost meters, as detailed in the table above and consideration should be given to using these first.   |
| Those patients, mainly type 1 diabetics, who need the facility to test for ketones                      | The recommended meter is the FreeStyle Optium Neo (FreeStyle Optium and FreeStyle Optium $\beta$ Ketone test strips).  |
| Those who are registered blind or partially sighted   | Will use meters with large displays or with voice guidance. The recommended meter is GlucoRx Nexus Voice meter.  |
| Those on insulin that require discreet testing and /or those that have problems with manual dexterity   | The Accu-chek Mobile could be used for those patients that need to test discreetly or have problems with their manual dexterity, <b>as long as a first line meter has been tried and the patient was unable to use it.</b> This meter is only intended for insulin patients.                         |
| Any patient for whom the GP or specialist considers it appropriate that they remain on a specific meter | Meter expected to be chosen from the following formulary choices, in the table below.  |

The formulary choices for the 20% of patients that are not recommended to use the lower cost meters are listed below:

| Meter Name                                      | Accu-chek Aviva Expert<br> | Accu-chek Mobile<br> | Contour XT<br> | FreeStyle Optium Neo<br> | FreeStyle InsuLinx<br> | GlucoRx Voice meter<br> |
|---|---|---|--|---|---|--|
| Testing Strips                                  | Accu-chek Aviva<br>£15.79/50  | Accu-chek Mobile<br>£32.48/100  | Contour Next<br>£15.04/50  | FreeStyle Optium<br>£15.71/50<br>FreeStyle Optium β<br>Ketone £21.14/10                                     | FreeStyle Lite<br>£15.80/50   | GlucoRx Nexus<br>£9.95/50  |
| Range and Test Time                             | 0.6-33.3 mmol/l 5 seconds   | 0.6-33.3 mmol/l 5 seconds   | 0.6-33.3 mmol/l 5 seconds  | Optium strips: 1.1-27.8 mmol/l 5 secs   | 1.1-27.8mmol/l 5 secs   | 1.1-33.3mmol/l 7 seconds   |
| Shelf life once opened                          | Until printed expiry date even if pot opened  | 90 days   | Until printed expiry date even if pot opened   | Until printed expiry date as individually wrapped   | Until printed expiry date even if pot opened  | 6 months (but comes as 2x25 strips)  |
| Special features                                | To provide dosing advice on insulin requirements  | 50 continuous strips and 6 lancets in a drum so no single lancets to touch. No clinical waste.        | No coding, quality test control sensitive  | Blood glucose testing with the added function of ketone testing   | Bolus Adviser System  | Small and portable device  |
| Memory  | 1000  | 2000  | 480  | 450   | Up to 165 days  | 450  |
| Compatible Lancets and Lancing Device           | Accu-chek FastClix Finger Pricker and FastClix Lancet Drum  | Accu-Chek FastClix finger pricker. All in one system  | Microlet 2 Device and Microlet Lancets   | Easy Touch Lancing Device and Lancets   | Easy Touch Lancing Device and Lancets   | GlucoRx Lancing Device and Lancets   |
| Company/Customer Care Line                      | Roche Diagnostics<br>0800 701 000   | Roche Diagnostics<br>0800 701 000   | Bayer Diagnostics<br>0845 600 6030   | Abbott Diabetes Care<br>0500 467 466  | Abbott Diabetes Care<br>0500 467 466  | Dime<br>01483 755 133  |
| Quality Control solution shelf life once opened | 3 months  | Single use  | 6 months   | 90 days   | 90 days   | 3 months   |



**Consumables** (e.g. batteries, Quality Control solution, USB cables etc.) are available free of charge from the Company Customer Care lines. Software download is available for all the meters listed. When changing a patient's meter please help reduce waste where possible by ensuring test strips for the previous meter are used before ordering the new strips.

**Cost Effective Lancets** – there are a range of lancets available at varying prices (please see BNF/Drug Tariff). A recommended cost effective lancet is the GlucoRx Lancets, which cost £5.50 per 200. These fit most lancing devices, but do not fit any Roche products. GlucoRx will provide their lancing device free of charge to practices if they wish to prescribe the GlucoRx Lancets.

**Prices – correct as of May 2016 (Drug Tariff and MIMS online May 2016)**