Guidance on the Self-Monitoring of Blood Glucose in Adults with Diabetes

Introduction

This guideline is designed to offer guidance for primary and secondary care on the use of self-monitoring of blood glucose in both Type 1 and Type 2 diabetes mellitus.

Type 1 Diabetes Mellitus

The purpose of self-monitoring of blood glucose should be clarified between the patient and the healthcare professional and should be incorporated into structured patient education (NICE Clinical Guideline 15). The approach to testing and target levels should be individualised and agreed in consultation with patients, as part of the care planning process. Test frequency will depend on the patient and their insulin regimen. A frequency of up to eight times daily is possible. More testing is required to meet driving requirements (see later).

Access to blood glucose testing strips in Type 1 Diabetes should not be restricted. This includes freedom of choice with regards to meters and unrestricted quantities of testing strips.

All results must be recorded with time and date to provide a cumulative record as a basis for day-to-day changes in therapy.

People prescribed insulin should be taught how to adjust therapy in line with their blood glucose monitoring.

Routinely pre meals and pre bed (Multiple Daily Injections)

One or two multi-point profiles a week at different times of day (BD premixed)

Test before bed and overnight ~ 2 – 3am if unrecognised hypoglycaemic episodes are suspected

Increased monitoring may be required during periods of:
- Illness
- Lifestyle changes
- Changes to diabetes medicines
- Pre-conception
- Impaired hypoawareness
- Frequent periods of hypoglycaemia
- Exercise
- Terminal care/end of life patients – BUT ONLY as part of a care plan

HbA1c should be measured every three to six months
Type 2 Diabetes

Routine self-monitoring of blood glucose is not required if patients are well controlled, and on non-insulin therapy that will not increase the risk of hypoglycaemia (including oral treatment, diet and exercise control). Patient education should clearly identify potential situations where hypo and hyperglycaemia may arise. Examples of these include:

- Any non-minor illness
- Concomitant systemic steroid therapy
- Initiation of a sulphonylurea/insulin

People with Type 2 diabetes usually have more stable glycaemic control and therefore advice on the frequency of testing will reflect this as well as the treatment they are on. In practice, the level of monitoring will vary according to the treatment regime in use and the target level of glycaemic control set for the patient, and driving requirements.

<table>
<thead>
<tr>
<th>Diet and exercise</th>
<th>Metformin and/or Pioglitazone, Gliptin / Liraglutide / Exenatide</th>
<th>Sulphonylurea and/or other treatments</th>
<th>Basal insulin and oral medication</th>
<th>BD Pre-Mixed insulin</th>
<th>Multiple daily injection (MDI) regimes</th>
</tr>
</thead>
</table>

HbA1c is the real outcome measure for these patients. Blood glucose monitoring should not be required routinely, but may be required:

- During illness
- When therapy is changed
- If steroids are co-prescribed (midday, before evening meal and 2 hours after evening meal)
- When regular HbA1c testing is not available
- Patients with postprandial hyperglycaemia
- Pre-conception care and pregnancy
- Terminal care/end of life patients BUT ONLY as part of a care plan

These patients are at risk of hypos. Testing may be a useful guide for:

- Evaluating lifestyle changes
- New or increased treatment
- Where required for driving

Fasting glucose can be used to titrate basal insulin dose and results and at other times to identify trends of hyper and hypoglycaemia

Test at various times including before meals and at bed time. May be advised post prandial in specific circumstances

As for Type 1
Driving

The main issue in relation to driving and the law is the risk of hypoglycaemia.

- It is important that any patient who is using treatment(s) that can cause hypoglycaemia (insulin / sulphonylurea) has the means to test their blood glucose.
- It is recommended that these patients test their blood glucose prior to driving, and at intervals (every 2 hours) during long journeys. Following hypoglycaemia and treatment to correct this, blood glucose must be in the normal range (above 5mmol/l) for 45 mins prior to resuming driving. There must be full hypo awareness at every episode.
- For Group 2 and vocational licences, evidence is required of twice daily blood glucose testing and at times related to driving (no more than 30 mins before the start of the first journey and at two hourly intervals while driving). These patients must have a blood glucose meter with the facility to store a minimum of 3 months of results, which is reviewed annually by an appropriate medical professional. All meters in use must be reviewed. A meter with the facility to download results is recommended and all recommended meters in this guidance have this facility.
- The DVLA require notification if there is one episode of unrecognised hypoglycaemia where assistance is required in previous 12 months.
- More information on driving and diabetes can be found on the Diabetes UK and DVLA websites.

Alternative Site Testing

These results **must be used with caution** in the following circumstances:

- When making frequent insulin dose adjustment decisions e.g. following new diagnosis.
- During illness management.
- Following exercise.
- For hypoglycaemia management, especially if poor warning symptoms.

Lancers and Lancets

- Each meter (see later) is supplied with a lancer and will require lancets on prescription.
- Lancers (the finger pricking devices) are not available on prescription.
- Replacement Lancers are available from companies (usually free of charge).
- Lancets are for single use only.

Pen Needles

The recommended pen needles for insulin injection devices are GlucoRx FinePoint needles. The advantages of standardising this choice are consistency and cost effectiveness. They are available in a full range of lengths; 4mm, 5mm, 6mm, 8mm, and 10mm (12mm is also available if needed). The needles are compatible with all leading insulin injection device manufacturers including Eli Lilly®, Novo Nordisk AS® and Sanofi®.
Blood Glucose Meters and Testing Strips

Blood glucose monitoring requires the use of appropriate equipment. The aim of this guidance is to limit the use of a wide variation of different blood glucose testing equipment across the locality. Advantages are; consistency, reduced risk of errors due to unfamiliarity with equipment, limited unnecessary prescribing, and cost effectiveness.

- Blood glucose testing should be used as part of a care plan for the management of diabetes following structured patient education which includes the purpose of testing.
- The decision to change meters should be used as an opportunity to review the purpose of testing and the interpretation of results.
- If a change in prescribed test strips is required, patients should be encouraged to use their current supply of test strips first, as long as the strips have not reached their expiry date and the current meter is in working order.
- The majority of test strips expire within 90 days of opening. If one container usage is over a longer period than this, review of blood glucose monitoring needs is recommended.
- Patients should be reminded to use control solutions/calibrate machines in line with manufacturer recommendations (as a minimum each time a new ‘pot’ of test strips is commenced).
- All the chosen meters are compliant with DVLA guidance, although the fully integrated device may encourage greater testing in Group 2/ vocational drivers.
- All the chosen meters meet ISO standards and do not require coding.
Blood Glucose Meters and Testing Strips

1st Choice Meter:

Accu-check Active

If not suitable to meet patient needs

2nd Choice Meters:

Visually impaired/ eyesight problems

GlucoRx Nexus Voice

Needs smaller/ lightweight meter

GlucoRx Mini

If not suitable to meet patient needs

3rd Choice Meter:

Patients who are carbohydrate counting, have more complex insulin regimes (TDS, basal bolus, MDI)

Contour NEXT

If not suitable to meet patient needs

4th Choice Meter:

Patients who require strip-free and/or sharps-free testing due to occupation/ job, especially to comply with DVLA guidelines for Group 2 and vocational drivers license holders

Accu-check Mobile

NB. These meters and strips should be suitable for the majority (~80%) of patients. There still remains the need for 'specialist' services to prescribe and recommend meters and strips that offer the facility for more specialised/specific requirements.

Details of the test strips and lancers required on prescription for each meter are included in the table below.
## Meter Name

<table>
<thead>
<tr>
<th>Meter Name</th>
<th>Test strips</th>
<th>Benefits</th>
<th>Lancets</th>
<th>Cost (50 strips)</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st Choice</strong></td>
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<tr>
<td>Accu-check</td>
<td>Accu-check Active test strips</td>
<td>- Easy to use&lt;br&gt;- 5 second results&lt;br&gt;- 18 month test strip expiry (no difference to expiry once opened)&lt;br&gt;- Large screen size&lt;br&gt;- Downloadable data</td>
<td>Accu-check Softclix Lancets</td>
<td>£9.95</td>
<td>Roche&lt;br&gt;Customer careline: 0800 701000&lt;br&gt;www.accu-check.co.uk&lt;br&gt;(NB specific site link for professionals)</td>
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<td><strong>2nd Choice</strong></td>
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<td>GlucoRx mini *</td>
<td>Specifically GlucoRx Nexus test strips</td>
<td>- Small lightweight meter&lt;br&gt;- 5 Second results&lt;br&gt;- Downloadable data&lt;br&gt;- Talking meter for patients who are visually impaired&lt;br&gt;- 6 month expiry once opened</td>
<td>GlucoRX lancets</td>
<td>£9.95</td>
<td>GlucoRx&lt;br&gt;Customer careline: 01483 755133&lt;br&gt;<a href="http://www.glucorx.co.uk/">http://www.glucorx.co.uk/</a>&lt;br&gt;<a href="mailto:info@glucorx.co.uk">info@glucorx.co.uk</a></td>
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<tr>
<td>GlucoRx Voice*</td>
<td>Specifically</td>
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SCCG Guidance on the Self-Monitoring of Blood Glucose in Adults with Diabetes
<table>
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<tr>
<th>3rd Choice – select/more specialised group of patients</th>
<th>Meter Name</th>
<th>Test strips</th>
<th>Benefits</th>
<th>Lancets</th>
<th>Cost (50 strips)</th>
<th>Company</th>
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<tr>
<td>Bayer Contour NEXT</td>
<td>Bayer Contour NEXT test strips</td>
<td>- Basal/ bolus + pre/post prandial functions - Downloadable data - 5 second results - 24 month test strip expiry once opened</td>
<td>Bayer Microlet lancets</td>
<td>£12.00</td>
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<td><a href="mailto:diabetes@bayer.co.uk">diabetes@bayer.co.uk</a></td>
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<tr>
<th>4th choice – select/more specialised group of patients</th>
<th>Meter Name</th>
<th>Test strips</th>
<th>Benefits</th>
<th>Lancets</th>
<th>Cost (50 strips)</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accu-chek Mobile</td>
<td>Accu-chek Mobile test cassettes</td>
<td>- Strip free testing - Integrated lancing device - No sharps handling or disposal - Downloadable data - 5 second results - 90 days expiry once inserted into device</td>
<td>Accu-chek FastClix Lancing drum</td>
<td>£15.95 per cassette of 50 tests Supplied in a pack of 2 x 50 at £31.95</td>
<td>Roche</td>
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<td>Customer careline: 0800 701000</td>
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<td><a href="http://www.accu-chek.co.uk">www.accu-chek.co.uk</a> (NB specific site link for professionals)</td>
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