Blood Glucose Monitoring

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Lead Executive Director: Executive Director of Nursing and Operations
Lead Author(s): Community Diabetes Specialist Nurse
**BLOOD GLUCOSE MONITORING**

Further information about this document:

<table>
<thead>
<tr>
<th>Document name</th>
<th>Blood Glucose Monitoring (33)</th>
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<tbody>
<tr>
<td>Document summary</td>
<td>This guideline is to support LCH nursing services in the appropriate use of blood glucose meters and the management of associated readings for people with diabetes whose care is delivered by LCH nursing services.</td>
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<td>Trust’s Website <a href="http://www.merseycare.nhs.uk">www.merseycare.nhs.uk</a></td>
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<td>To be read in conjunction with</td>
<td>This document can be made available in a range of alternative formats including various languages, large print and braille etc</td>
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**Version Control:**

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SUPPORTING STATEMENTS
this document should be read in conjunction with the following statements:

SAFEGUARDING IS EVERYBODY’S BUSINESS
All Mersey Care NHS Foundation Trust employees have a statutory duty to safeguard and promote the welfare of children and adults, including:

• being alert to the possibility of child / adult abuse and neglect through their observation of abuse, or by professional judgement made as a result of information gathered about the child / adult;

• knowing how to deal with a disclosure or allegation of child /adult abuse;

• undertaking training as appropriate for their role and keeping themselves updated;

• being aware of and following the local policies and procedures they need to follow if they have a child / adult concern;

• ensuring appropriate advice and support is accessed either from managers, Safeguarding Ambassadors or the trust’s safeguarding team;

• participating in multi-agency working to safeguard the child or adult (if appropriate to your role);

• ensuring contemporaneous records are kept at all times and record keeping is in strict adherence to Mersey Care NHS Foundation Trust policy and procedures and professional guidelines. Roles, responsibilities and accountabilities, will differ depending on the post you hold within the organisation;

• ensuring that all staff and their managers discuss and record any safeguarding issues that arise at each supervision session

EQUALITY AND HUMAN RIGHTS
Mersey Care NHS Foundation Trust recognises that some sections of society experience prejudice and discrimination. The Equality Act 2010 specifically recognises the protected characteristics of age, disability, gender, race, religion or belief, sexual orientation and transgender. The Equality Act also requires regard to socio-economic factors including pregnancy /maternity and marriage/civil partnership.

The trust is committed to equality of opportunity and anti-discriminatory practice both in the provision of services and in our role as a major employer. The trust believes that all people have the right to be treated with dignity and respect and is committed to the elimination of unfair and unlawful discriminatory practices.

Mersey Care NHS Foundation Trust also is aware of its legal duties under the Human Rights Act 1998. Section 6 of the Human Rights Act requires all public authorities to uphold and promote Human Rights in everything they do. It is unlawful for a public authority to perform any act which contravenes the Human Rights Act.

Mersey Care NHS Foundation Trust is committed to carrying out its functions and service delivery in line with a Human Rights based approach and the FREDA principles of Fairness, Respect, Equality Dignity, and Autonomy
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1. Introduction

Good glycaemic control has been shown to reduce the occurrence of major complications in patients with Type 1 and Type 2 Diabetes. Therefore, monitoring glycaemic control is important. Where possible, patients should be actively involved e.g. reporting of osmotic symptoms and hypoglycaemia and, in some patients, Self-Blood Glucose Monitoring (SBGM).

Monitoring the blood glucose levels is an effective tool in the management of glucose levels in people with Type 1 diabetes and people with Type 2 diabetes using insulin therapy and sulphonylureas. It helps people with diabetes using insulin/ sulphonylureas achieve improved glycaemic control and to identify low blood glucose levels before the development of severe hypoglycaemia.

2. Purpose

This guideline has been developed to provide evidence based guidance on the monitoring of blood glucose levels for people living with diabetes whose care is delivered by LCH Nursing Services.

3. Scope

This guideline is applicable to all staff working for LCH involved in the monitoring of blood glucose levels in people living with diabetes.

4. Definitions

Glucometer: A Trust approved meter used for capillary blood testing, which is subject to internal and external quality assurance.

Lead clinician: The clinician with overall responsibility for the care of the patient. This will usually be the GP.

5. Roles and Responsibilities

It is the responsibility of the clinician performing the test to ensure they have attended the relevant training and follow the procedures as set out in this document.

6. Self-blood glucose monitoring

The recommendation for adults with Type 1 Diabetes who self-monitor is to monitor four times daily before each meal and bed and up to ten times a day as per NICE guidelines.

For adults with Type 2 Diabetes with insulin they would have individual recommendations by their Health Care Professional (HCP) for the frequency of monitoring.

7. Blood Glucose Monitoring and Management of Results by
Community Nursing Service

7.1 Patients on Insulin Administered by Nursing Services

The Nursing Service should offer to check the Capillary Blood Glucose (CBG) level prior to administering insulin, ensuring that the patient is aware of the best practice guidance on the frequency of testing for patients with diabetes.

The frequency of Blood Glucose monitoring in people with diabetes should be agreed on an individual basis after discussion with the patient and the nursing staff. This should take into account any advice or guidance from the main provider of care and be part of a management plan.

If the patient declines to the testing schedule that the nursing team feel is appropriate and safe for the patient, the lead clinician should be informed and their guidance sought.

7.2 Patients Not on Insulin Administered by Nursing Services

For patients new to sulphonylurea/steroids/diabetogenic drugs and unable to monitor - an agreed individual care plan on the variation on monitoring from either clinical need or patient choice should be discussed with the lead clinician responsible for patient care.

7.3 Increasing Monitoring

Monitoring should be increased

- If there are any changes to treatment
- During illness
- Increase in hypoglycaemia especially for patients who drive - refer to DVLA guidelines
- Steroid therapy
- Foot problems
- During pregnancy
- Hypo unawareness

7.4 HbA1c Monitoring

For Patient Treated with Insulin

- Patients treated with insulin should have their HbA1c checked every 3 months

For Patients Not Treated with Insulin

- Patients not treated with insulin should have their HbA1c checked every 3-6 months or as documented in individual management plan.

8. Managing results

It is the responsibility of the clinician performing the test to act on the result(s).
Targets should be individualised. Tight glycaemic control increases the risk of hypoglycaemia in the elderly (especially if living alone) or those with poor hypoglycaemic awareness. Avoidance of hypoglycaemia may be a greater priority.

NICE guidelines for Type 1 and Type 2 Diabetes suggest CBG levels in the elderly aim for 5-8.5mmol/mol fasting and random results 9mmol/mol. The HbA1c target is 53-64mmol/mol on insulin. If CBG levels are continual high seek advice from the lead clinician.

In Type 1 Diabetes check urine for ketones if CBG above 15 mmol/mol. If ketonuria moderate to large (+2 or above) or patient is vomiting seek advice from the lead clinician. If no support available advise to go to AED for assessment of ketoacidosis. Continue to assess CBG and ketones every four hours.

Before altering treatment, ensure dietary compliance and that the medication is prescribed and administered at the correct times.

**8.1 Illness management for Type 1 Diabetes**

- In Type 1 diabetes check urine for ketones if CBG above 15 mmol/mol. If ketonuria moderate to large (+2 or above) Dial 999
- If vomiting seek advice from the appropriate HCP immediately
- Assess for ketones and check CBG levels every 4 hours when possible, negotiated in partnership with patient and carers.
- NEVER stop insulin - if CBG continually high seek advice from the appropriate specialist team or GP
- If ketones present advise to rest
- Drink at least 2 litres of sugar free fluids to prevent dehydration - even small sips are helpful - throughout the day
- Try to eat a normal diet
- If unable to eat replace meals with fluids such as milk, fresh orange juice, soup or small amounts of Lucozade through the day
- Contact GP to assess for an infection

**8.2 Illness management for Type 2 Diabetes**

- NEVER stop diabetes medication
- If patient on tablets and has diarrhoea advise to seek medical advice
- Check CBG levels every 4 hours if on insulin, when possible and after negotiation with patient and carers
- Drink at least 2 litres of sugar free fluids to prevent dehydration - even small sips are helpful – throughout the day
- Try to eat a normal diet
- If unable to eat, replace meals with fluids such as milk, fresh orange juice, soup or small amounts of Lucozade through the day
- Contact GP to assess for an infection
8.3 End of Life Management

For management of patients at the end of life, please refer to the Diabetes UK clinical recommendations, see references section at the end of this policy.

8.4 Management of Hypoglycaemia

8.4.1 those patients able to swallow

Capillary blood glucose level below 4mmol/mol:

Give 20-30g quick acting carbohydrate immediately. Examples:

- 5 or 6 Dextrose tablets (Gluco tabs or Lucozade) or
- Lucozade Energy - **10g of carbohydrate will require 110ml**
  - Meanwhile, **15g of carbohydrate will require 170ml**.
    - 170 mls of Lucozade, while
    - 150 mls of full sugared fizzy drink (not ‘diet’) or
    - 2 tubes of glucose gel or
    - 5 – 6 Jelly Babies

Repeat every 5-10 minutes until Blood Glucose level >4 mmol/mol, if still less than 4.0mmol/mol, repeat step 1 up to 3 times. If the blood glucose level is not responding dial 999.

If blood glucose remains less than 4mmol/mol after 45 minute or three cycles, dial 999.

Once the blood glucose level is above 4mmol/mol give a snack containing carbohydrates or give meal if due. Example:

- The patient’s next meal if due, or a bowl of plain cereal
- 2 plain biscuits
- A sandwich or 2 pieces of toast

8.4.2 For those patients unable to swallow or who are unconscious

- If possible, place patient in the recovery position
- Dial 999
- Administer glucagon according to patient’s management plan as agreed by Specialist Services

Following a Hypoglycaemic episode:

- Insulin and/or oral hypoglycaemic agents must not be omitted, however dose review should be considered
- Once the hypoglycaemic episode has been treated as above and blood glucose level is >4 mmol/mol, the usual medication should be administered when due
- Record all hypoglycaemic episodes and treatment in the blood glucose monitoring diary/care pathway
· Try to identify the cause and if recurrent refer to the Diabetes Specialist Nurses or GP for review / advice

8.5 Glycated Haemoglobin (HbA1c)

Glycated haemoglobin is formed through a non-enzymatic process between glucose and haemoglobin. The amount of glycation depends upon the concentration of blood glucose and the time over which the red blood cell is exposed to it.

Measuring HbA1c reflects the blood glucose concentrations over the red cell’s lifespan i.e. 2-3 months. It provides an accurate, reproducible measure of a patient’s long-term blood glucose control.

Reliability of HbA1c levels relies on normal red cell lifespan, 8-12 weeks exposure to glucose levels and normal haemoglobin type for correct analysis.

HbA1c may not be reliable as a marker of average blood glucose control and can be falsely low in the following situations:

· Recent blood transfusion
· Anaemia due to blood loss
· Abnormal red cells or haemoglobin resulting in shortened red cell lifespan e.g. hereditary spherocytosis, sickle cell anaemia and other forms of haemoglobinopathy
· Very recent onset of diabetes e.g. Type 1 diabetes or steroid induced diabetes

General target is 53 however in the elderly targets can be 53-64 mmol/mol dependent on the treatment plan taking into account their risk of severe hypoglycaemia, cardiovascular status and co-morbidities.

HbA1c can be measured at any time of day and is unaffected by meals. Use a yellow bottle (Monovette system) or purple bottle (Vacutainer system) and a clinical chemistry form.

Targets should be individualised. Tight glycaemic control increases the risk of hypoglycaemia. In the elderly (especially if living alone) or those with reduced hypoglycaemic awareness a higher target may be more appropriate.

HbA1c should be used in conjunction with any recorded blood glucose levels when assessing overall blood glucose control. Treatment changes can then be made with more accuracy.

9. Training

For training to support the implementation of this Policy, please refer to the Trust Training Needs Analysis.

Staff must have completed:
The Blood Glucose Monitoring training
A recognised course on the management of diabetes (a minimum of the 2 day foundation course)

1. Audit / Monitoring

The interim deputy director of nursing is responsible for audit against this document. Audit will take place in line with review of the policy.

Recommendations from this audit will be reported to the appropriate Governance meeting with responsibility for any subsequent actions to be agreed. Subsequent monitoring of the actions will take place at the appropriate Governance meeting.

Where identified, any recommendations from the clinical audit will inform the review of the Policy.

2. Equality Analysis

An equality analysis has been completed for this by the author in conjunction with the Equality and Diversity Team. A copy of this is with the Equality and Diversity Team.

3. Related Documents

This document should be read in conjunction with the following:

- Consent Policy
- Infection Control Policies
  - Management of a Needle stick Injury Policy
  - Safe Handling and Disposal of Sharps
  - Hand Hygiene Policy
  - PPE

4. References


2. Diabetes UK Guide to Ketoacidosis
3. Recognition, treatment and prevention of hypoglycaemia in the community. NHS Diabetes December 2011
www.diabetesonthenet.com/download/content/1684


https://www.nice.org.uk/guidance/cg87

6. NHS choices hypoglycaemia
http://www.nhs.uk/conditions/Hypoglycaemia/Pages/Introduction.aspx

7. Diabetes UK new Lucozade change guidance

8. DVLA guidance
https://www.gov.uk/guidance/diabetes-mellitus-assessing-fitness-to-drive
https://www.gov.uk/hypoglycaemia-and-driving

9. Diabetes UK end of life care guidance
https://www.diabetes.org.uk/professionals/position-statements/.../end-of-life-care

10. NICE Type 1 diabetes in adults overview

11. Diabetes UK good practice guidelines for care home residents with diabetes (January 2010)
https://www.diabetes.org.uk/resources-s3/2017-09/Care-homes-0110_0.pdf?_ga=2.238422405.468428599.1505127410-1295258485.1505127410