# PROCEDURE FOR BLOOD GLUCOSE MONITORING

<table>
<thead>
<tr>
<th>Issue History</th>
<th>Issue Version</th>
<th>Purpose of Issue/Description of Change</th>
<th>Planned Review Date</th>
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<tr>
<td></td>
<td>Three</td>
<td>To promote safe and effective blood glucose monitoring using Trust equipment</td>
<td>2016</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Named Responsible Officer:-</th>
<th>Approved by</th>
<th>Date</th>
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<tbody>
<tr>
<td>Quality &amp; Governance Service</td>
<td>Quality, Patient Experience and Risk Group</td>
<td>October 2013</td>
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## Target Audience
- Multidisciplinary

**UNLESS THIS VERSION HAS BEEN TAKEN DIRECTLY FROM TRUST WEB SITE THERE IS NO ASSURANCE THIS IS THE CORRECT VERSION**
# Procedure for Blood Glucose Monitoring

**Title**: Procedure for Blood Glucose Monitoring

**Purpose**: To promote safe and effective blood glucose monitoring using Trust equipment

**Author**: Quality and Governance Service (QGS)

**Equality Assessment**: Integrated into procedure

**Subject Experts**: Mary Lyden-Rodgers

**Groups consulted with**: Clinical Policies and Procedures Group

**Infection Control Approved**: 27th September 2013

**Date approved by Quality, Patient Experience and Risk Group**: 25th September 2013

**Method of Distribution**: Email

**Archived**: Date

**Access**: Via QGS

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### Version Control Record

<table>
<thead>
<tr>
<th>Version Number</th>
<th>Author</th>
<th>Status</th>
<th>Changes / Comments</th>
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<tbody>
<tr>
<td>Version 3</td>
<td>M Lyden Rodgers</td>
<td>R</td>
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</tr>
</tbody>
</table>

Status – New / Revised / Trust Change
PROCEDURE FOR BLOOD GLUCOSE MONITORING

INTRODUCTION

Blood glucose is the amount of glucose in the blood (expressed millimoles per litre (mmol/L)). Blood glucose is regulated by insulin and glucagon. Blood monitoring (BM) is used to indicate when blood glucose is not within the normal range (4-7 mmol/L). It is used to monitor and manage the treatment of both insulin-dependent diabetes mellitus (IDDM) and non-insulin dependent diabetes mellitus (NIDDM).

Procedure complies with NHS Litigation Authority Risk Management Standards (2013) for the Trust for clinical diagnostic tests.

TARGET GROUP

The procedure applies to Wirral Community Trust staff who have successfully undertaken training and who will be required to work within this procedure as part of their role.

TRAINING

All staff in the Trust are required to comply with mandatory training as specified in the Trusts Mandatory Training Matrix. Clinical Staff are also required to comply with service specific mandatory training as specified within their service training matrix.

RELATED POLICIES

Please refer to relevant Trust policies and procedures

INDICATIONS

The conditions in which blood glucose monitoring will need to take place include the following:

- To monitor and manage the day-to-day treatment of known type 1 and type 2 diabetes
- In acute management of unstable diabetes, that is, evidence of hyperglycaemia, hypoglycaemia, and diabetic ketoacidosis.
- To assist with clinical decision making when carrying out clinical assessments or monitoring of other medication such as steroids
- To make a diagnosis of diabetes indicated by signs and symptoms of polyuria, polydipsia, weight loss of type 1 or weight gain, family history of type 2 (Dougherty and Lister, 2011)
- Patients taking steroids and other drugs that cause raised blood glucose (see Appendix II)
CONTRAINDICATIONS

The following conditions can affect the accuracy of blood glucose monitoring and it may be necessary to obtain a venous sample for more accurate results (DH 2005)

- Peripheral circulatory failure and severe dehydration for example, diabetic ketoacidosis, hyperosmolar hyperglycaemic state, shock, hypotension. These conditions cause peripheral shutdown, which can cause artificially low capillary readings.

- Some renal dialysis treatments

- Hyperlipidaemia: cholesterol levels above 13 mmol/L may lead to artificially raised capillary blood glucose readings

- Intravenous infusion of ascorbic acid

- Pre-eclampsia

- Haematocrit values above 55% may lead to inaccurate levels if the blood glucose level is more than 11mol/L

(Dougherty and Lister, 2011)

CONSENT

Valid consent must be given voluntarily by an appropriately informed person prior to any procedure or intervention. No one can give consent on behalf of another adult who is deemed to lack capacity regardless of whether the impairment is temporary or permanent. However such patients can be treated if it is deemed to be within their best interest. This must be recorded within the patient’s health records with a clear rationale stated at all times. Refer to Trust Patient Information and Consent Policy for further information and guidance or the Clinical Protocol for Assessing Mental Capacity and Best Interests.

EQUIPMENT

- Blood glucose monitor
- Quality Control / Patient record book
- Single use test strips
- Trust approved single use lancets
- Quality control solution
- Gauze swabs
- Single use disposable apron
- Single use disposable non sterile gloves
- Sharps container
- Trust approved cleaning wipes
Diagnostic and Screening Standards to Promote and Maintain Patient Safety (if relevant)

<table>
<thead>
<tr>
<th>Description of how each step in the process is undertaken</th>
<th>Additional comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. How the Screening/Diagnostic procedure is requested</strong></td>
<td>This procedure is performed (a) as per individualised care plan or (b) if hypoglycaemic / hyperglycaemic incident is suspected.</td>
</tr>
<tr>
<td>This is dependent upon the stability of the patient's blood glucose levels. Unstable diabetics will have an individualised care plan detailing regularity of BM checks.</td>
<td></td>
</tr>
<tr>
<td><strong>b. How the clinician treating the patient is informed of the results (including timescales)</strong></td>
<td>The results from the blood glucose meter reading are immediate.</td>
</tr>
<tr>
<td>All BM meter reading machines should be quality controlled. (See internal and external quality control measures in Appendix)</td>
<td></td>
</tr>
<tr>
<td><strong>c. How the patient is informed of the results (including timescales)</strong></td>
<td>The patient will be informed of results by clinician immediately.</td>
</tr>
<tr>
<td><strong>d. Taking action on the result of diagnostic/screening tests (including timescales) :-</strong></td>
<td>The clinician will make a decision based on the blood glucose reading (BM).</td>
</tr>
<tr>
<td>The clinician will have the skills to recognize and treat episode of care based upon blood glucose reading (BM).</td>
<td></td>
</tr>
</tbody>
</table>

→ documentation of the result

Recorded in health records

→ interpretation of the result

By the clinician

Any concerns should be communicated to the GP and Patient and recorded in health records.

→ how patient is followed up or referred following a screening

By the clinician

Which staff are authorised to request this test?

All clinical staff who have a clinical rationale, within their role as to why they are requesting/performing procedure.

**PROCEDURE**

**QUALITY CONTROL**

Any blood glucose monitor used by a member of Trust staff must have undergone the appropriate quality control testing/calibration prior to use. Please see Appendix 2
<table>
<thead>
<tr>
<th>ACTION</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbally confirm the identity of the patient by asking for their full name and date of birth. If client unable to confirm, check identity with family/carer</td>
<td>To avoid mistaken identity</td>
</tr>
<tr>
<td>Introduce yourself as a staff member and any colleagues involved at the contact</td>
<td>To promote mutual respect and put client at their ease</td>
</tr>
<tr>
<td>Wear identity badge which includes name status and designation</td>
<td>For patients to know who they are seeing and to promote mutual respect</td>
</tr>
<tr>
<td>Ensure verbal consent for the presence of any other third party is obtained</td>
<td>Students for example, as the client has the choice to refuse</td>
</tr>
<tr>
<td>Explain procedure to patient including risks and benefits and gain valid consent.</td>
<td>To ensure client understands procedure and relevant risks and to allay fears or anxieties</td>
</tr>
<tr>
<td>Check that quality control test has been carried out that day – test machine if necessary</td>
<td>To ensure machine is functioning correctly</td>
</tr>
<tr>
<td>Advise patient to wash and dry their hands using soap and water, prior to procedure – assist if necessary. Do not use alcohol gel.</td>
<td>To prevent sample contamination</td>
</tr>
<tr>
<td>Decontaminate hands prior to the procedure</td>
<td>To reduce the risk of transfer of transient micro-organisms on the healthcare workers hands</td>
</tr>
<tr>
<td>If indicated, apply single use disposable apron</td>
<td>To protect clothing or uniform from contamination and potential transfer of micro-organisms</td>
</tr>
<tr>
<td>Apply single use disposable non sterile gloves</td>
<td>To protect hands from contamination with organic matter and transfer of micro-organisms</td>
</tr>
<tr>
<td>Prepare single-use disposable lancet device as per manufacturer's instructions</td>
<td>To ensure correct use of equipment</td>
</tr>
<tr>
<td>Remove new test strip from vial, replace lid tightly</td>
<td>To prevent deterioration of remaining strips</td>
</tr>
<tr>
<td>Within 30 seconds, insert test strip (yellow window facing up) into test strip slot. The meter should turn on automatically</td>
<td>To initiate process of analysis</td>
</tr>
<tr>
<td>Check that current meter code and test strip code match. If a new pack of strips is required, the meter should be recalibrated.</td>
<td>To ensure machine is calibrated to test strip</td>
</tr>
<tr>
<td>Ask patient to sit or lie down</td>
<td>To ensure the patient’s safety and minimize the risks if they feel faint when blood is taken</td>
</tr>
<tr>
<td>Using the single use lancet, obtain a blood sample from the side of the finger</td>
<td>Side of finger is a less painful site to use</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Sites should be rotated if testing is frequent</td>
<td>Reduce the risk of infection from multiple puncturing and prevents areas from toughening</td>
</tr>
<tr>
<td>Avoid using thumb or index finger</td>
<td>Less painful (most frequently used digits have a more sensitive nerve supply)</td>
</tr>
<tr>
<td>The finger may bleed without assistance, but may need ‘milking’ gently</td>
<td>Droplet needs to be of sufficient size to cover test pad</td>
</tr>
<tr>
<td>Apply a drop of blood to the strip by holding the patient’s finger to the edge of the strip until the yellow window is completely filled with blood</td>
<td>The blood will be drawn into the strip automatically</td>
</tr>
<tr>
<td>Do not place blood on top of the strip.</td>
<td>A bleep should be heard which indicates that the test is beginning</td>
</tr>
<tr>
<td>If any part of the yellow window remains yellow after the initial drop of blood has been applied, a second drop of blood may be applied to the edge of the test strip within 15 seconds of the first drop.</td>
<td>If more than 15 seconds have passed, the test result may be erroneous and you should discard the test strip and repeat the test</td>
</tr>
<tr>
<td>Dispose of used lancet into a sharps container</td>
<td>To reduce the risk of inoculation injury</td>
</tr>
<tr>
<td>Remove test strip from meter and switch meter off</td>
<td>To prevent cross infection and environmental contamination</td>
</tr>
<tr>
<td>On completion of procedure remove and dispose of PPE to comply with waste management policy.</td>
<td>To remove any accumulated transient and resident skin flora that may have built up under the gloves and possible contamination following removal of PPE.</td>
</tr>
<tr>
<td>Decontaminate hands following removal of PPE</td>
<td>Decontamination of medical equipment is essential to the effective delivery of patient care</td>
</tr>
<tr>
<td>Decontaminate reusable equipment using a Trust approved cleaning wipe</td>
<td></td>
</tr>
<tr>
<td>Document all actions, observations and results (including consent and patient perceptions) in nursing records.</td>
<td>Ensure compliance with Nursing and Midwifery Council and local record keeping guidelines</td>
</tr>
<tr>
<td>If any clinical concerns regarding the management of blood glucose levels contact either :-</td>
<td>Contact GP Out of Hours in an emergency to seek medical advice.</td>
</tr>
<tr>
<td>• General Practice (GP)</td>
<td>If possible, avoid using GP Out of Hours on a routine basis for ongoing advice, as this</td>
</tr>
</tbody>
</table>
PROCEDURE FOR BLOOD GLUCOSE MONITORING

INCIDENT REPORTING

Clinical incidents or near misses must be reported via the Trust’s Datix incident reporting system.

SAFEGUARDING

In any situation where staff may consider the patient to be a vulnerable adult, they need to follow the Trust Safeguarding Adult Policy and discuss with their line manager and document outcomes.

REFERRALS

Any referrals to health professionals, therapists or other specialist services must be followed up and all professional advice or guidance documented in the patient’s health records.

EQUALITY ASSESSMENT

During the development of this procedure the Trust has considered the clinical needs of each protected characteristic (age, disability, gender, gender reassignment, pregnancy and maternity, race, religion or belief, sexual orientation). There is no evidence of exclusion of these named groups.

If staff become aware of any clinical exclusions that impact on the delivery of care a Trust Incident form would need to be completed and an appropriate action plan put in place.
REFERENCES


**RISK ASSESSMENT FOR SCREENING/DIAGNOSTIC PROCEDURES**

**Name of Screening/Diagnostic Procedure:** Blood Glucose Monitoring  
**Date risk assessed:** 16th September 2013  
**Risk assessed by:** Quality and Governance Service

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Likelihood that process will fail</th>
<th>Risk identified in process</th>
<th>Mitigation/Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Process for requesting the screening/diagnostic procedure</td>
<td>√</td>
<td>The clinician may not receive the request to carry out blood glucose monitoring procedure</td>
<td>It is the responsibility of the referrer to ensure the clinician carrying out the test receives the referral</td>
</tr>
<tr>
<td>b. Process for informing the clinician treating the patient of the result</td>
<td>√</td>
<td>The clinician will have access to the results immediately</td>
<td>All BM meter reading machines should be quality controlled to ensure the machine is working properly. (See internal and external quality control measures )</td>
</tr>
<tr>
<td>c. Process for informing the patient of the result</td>
<td>√</td>
<td>The patient does not receive the results immediately</td>
<td>The patient should be advised of when the results would be available</td>
</tr>
<tr>
<td>d/e. Process for action from a diagnostic test or following-up or referring the patient after a screening test</td>
<td>√</td>
<td>Results may not be actioned within an appropriate time frame</td>
<td>It is the responsibility of the person who has carried out the test to follow up or refer the patient after screening</td>
</tr>
<tr>
<td>Identify risks from the ‘process’ of conducting the test if relevant</td>
<td>√</td>
<td>The machine not functioning properly</td>
<td>To obtain another blood glucose monitoring machine</td>
</tr>
</tbody>
</table>
QUALITY CONTROL

Any blood glucose monitors used by a member of staff must have undergone the appropriate quality control testing prior to use.

INTERNAL QUALITY CONTROL

- Always use both quality control solutions
- Apply 1 drop of Solution 1 to test strip and document result obtained in quality control book (one book per meter, these books must be kept for 11 years)
- Repeat for Solution 2
- Check that results are within agreed limits as stated on test strip container – do not use machine if results are outside suggested parameters
- The quality control solutions last for 3 months from date of opening
- Date both bottles with the 3 month expiry date

When to carry out procedure:

- Prior to use each day
- Monthly if the machine is not in use
- When starting a new pack of test strips
- After changing meter batteries
- After an unexpected result – to check technique
- To check performance of meter and strips
- If the meter has been dropped

EXTERNAL QUALITY CONTROL

External quality control would be carried out four times a year using sample control solutions coordinated by the community nursing office. Results from external quality control testing must be submitted for each machine when requested.

There is a requirement to monitor the quality of the results of the device and the person operating it. This is both a hospital and a Government directive.

N.B. The external quality control procedure must not be the responsibility of a single practitioner, all team members must participate in carrying out this procedure as this also tests the technique of the tester.

It is the responsibility of the caseload manager / team leader to ensure there are systems in place to monitor compliance with this procedure and provide evidence this is in place, should there be a need to track external quality controls.

METER CODING

Before the meter is used for the first time, and with each new box of test strips, the meter must be set to ‘match’ the strips in use. This process is referred to as ‘coding’.
Coding Process

- Ensure the meter is turned off. Turn meter over so you are looking at the back. Remove old Code Key if one is installed (Code key is in the vial of test strips)
- Insert new Code Key until it snaps into place
- Turn meter ON. A 3-digit code number appears. This number must match the code number on your vial test strips. If it does not, repeat step 1.

FREQUENCY OF CAPILLARY BLOOD GLUCOSE MONITORING FOR PATIENTS USING INSULIN THERAPY

Patients using insulin may need to adapt the frequency of their blood glucose testing due to numerous factors.

These include:

- concomitant illness
- pregnancy
- following a change in treatment
- occupational factors such as driving
- If treatment includes tablets such as steroids
- poor glycaemic control

For patients who are stable it is recommended to routinely test blood glucose four times a day (pre-meals and pre-bed) on two days per week. (Wirral Community Trust Medicines Management Clinical Protocol MMCP03 ‘The Management of Patients with Diabetes who require insulin in a community setting’ (2010).

Frequency will be determined by clinical assessment of need. Where there is shared care between day community nursing services and the night community nursing service, there needs to be a clear action plan for linking with the Diabetic Nurse Specialist should the clinical need arise.

Hyperglycaemia is a recognised side effect of corticosteroid therapy, in both diabetic and non-diabetic patients. It is therefore important to monitor blood glucose levels in all palliative patients on the Community Nursing caseload receiving corticosteroid therapy.

If the patient and informal carer/family member is unable to perform the blood glucose monitoring procedure, patients who have a palliative diagnosis on the Community Nursing caseload will have their blood glucose levels tested by the Community Nursing Service when they are commenced on corticosteroids whether they are diabetic or non-diabetic. As a minimum, patients should have their blood glucose levels monitored at day 2, day 7 and day 14 from the date when the patient started to take the medication. Please refer to Merseyside and Cheshire Palliative Care Network Audit Group Guidelines for the monitoring and management of blood glucose in patients on corticosteroids (Appendix III). Community Nursing staff are to refer back to the patient’s General Practitioner for further treatment according to the guidelines when required.
GUIDELINES FOR THE MONITORING AND MANAGEMENT OF BLOOD GLUCOSE IN PATIENTS ON CORTICOSTEROIDS

Merseyside and Cheshire Palliative Care Network Audit Group (2010)