Trust-wide Document

NHS
Great Western Hospitals
NHS Foundation Trust

Blood Glucose Estimation (Adults & Children) Trust-wide Policy and Procedure

Document No	UC - 00030	**Version No**	1.0
Approved by	Policy Governance Group	**Date Approved**	21/07/2021
Ratified by	Unscheduled Care Quality Meeting	**Date Ratified**	14/07/2021
Date implemented (made live for use)	05/08/2021	**Next Review Date**	14/07/2024
Status	LIVE		
Target Audience- who does the document apply to and who should be using it. - The target audience has the responsibility to ensure their compliance with this document by: • Ensuring any training required is attended and kept up to date. • Ensuring any competencies required are maintained. • Co-operating with the development and implementation of policies as part of their normal duties and responsibilities.	This policy and procedure document covers blood glucose monitoring by Registered Nurses and Midwives, Health-care support workers (who have completed the Trust care certificate and with agreement from their line Manager), , Assistant practitioners, Senior Operating Department Assistants, and Anaesthetists who have received appropriate training from the Medical Device Training Team, a designated device trainer or appropriate company trainer for the specific meter utilised and then completes the GWH Blood glucose clinical competency.		
Special Cases	For Neonatal please refer to the Prevention & Management of Hypoglycaemia of the Newborn Policy (Ref 7)		
Accountable Director	Associate Medical Director		
Author/originator – Any Comments on this document should be addressed to the author	Senior Sister Diabetes		
Division and Department	Unscheduled Care		
Implementation Lead	Senior Sister Diabetes Nurse Team.		
If developed in partnership with another agency ratification details of the relevant agency	N/A		
Regulatory Position			
Review period. This document will be fully reviewed every three years in accordance with the Trust's agreed process for reviewing Trust -wide documents. Changes in practice, to statutory requirements, revised professional or clinical standards and/or local/national directives are to be made as and when the change is identified.			

Contents

1 Introduction & Purpose

1.1 Introduction & Purpose

This policy and procedure document is developed to ensure the correct process is followed to ensure safe and accurate measurement and interpretation of blood glucose levels (BGL) / Capillary blood glucose (CBG) by employees trained to perform this clinical procedure.

It also sets out guidance for employees required to test patient's blood to obtain results for blood glucose monitoring purposes, via a blood glucose meter. The results of which must be correctly recorded, interpreted and responded to appropriately.

Employees using a blood glucose meter must be trained face to face initially via relevant employees (see section 2.6 Training, for full details), complete and maintain the GWH Measurement of patients blood glucose levels using the Roche Accuchek Performa for all clinical employees at GWH – Clinical Competency- (Ref 1) and complete update training via the Great Western Hospitals NHS Foundation Trust (the Trust) Training Tracker.

For further information regarding the current Trust approved blood glucose meter please refer to the blood glucose meters operation manual for the current Trust approved blood glucose meters
Operation manual kept in Blood glucose workstation, replacement copies available from the Laboratory Point of Care testing lead or Diabetes Nurse Team.

Employees must complete blood glucose monitoring training and competency (Ref 1) via the academy relevant to the device in their area to enable blood glucose monitoring.

1.2 Glossary/Definitions

The following terms and acronyms are used within the document:

®	Registered mark
%	Percentage
ANTT	Aseptic Non-Touch Technique
BGL(s)	Blood Glucose Level(s)
CBG	Capillary Blood Glucose (used in maternity services)
CQC	Care Quality Commission
D&O	Diagnostic and Outpatients
DKA	Diabetic KetoAcidosis
DSN	Diabetes Specialist Nurse
ESR	Electronic Staff Record
GWH	Great Western Hospital
IP&C	Infection Prevention and Control
mmol/l	Millimoles per Litre
NHS	National Health Service
NICE	National Institute for health and Care Excellence
NVQ	National vocational qualification.
POCT	Point of Care Testing
QC	Quality Control
SGLT2	Sodium-Glucose Co-Transporter 2
SOP	Standard Operating Procedure
TAPs	Trainee Assistant Practitioners

2 Main Document Requirements

This document details the parameters recognised in the Trust to follow alongside the correct procedure to ensure employees follow a suitable process to perform blood glucose testing, to recognise normal/abnormal ranges, how to interpret them, and clinical contraindications to testing.

2.1 Interpretation of Blood Glucose Levels (BGLs) (normal and pathological values)

The following gives the required action for BGLs falling within certain ranges. Blood glucose is most easily interpreted in samples taken just before meals or following an overnight fast however samples taken at other times should not be excluded in evaluation of the patient's clinical condition.

These levels are not applicable to neonates, Please see T:Drive / Trust-wide Documents / Maternity - Women & Children's - Prevention & Management of Hypoglycaemia of the Newborn Policy (Ref 7)

(BGLs are provided only in Millimoles per litre (mmol/l))

2.2 Table 1 – Clinical Interpretation of BGLs falling within Certain Ranges

Blood Glucose	Indication
Less than 4 mmol/l	**Hypoglycaemia requiring glucose.** Patient may not experience symptoms but requires glucose. As per HYPOBOX Treatment of glycaemia treatment pathway (Ref 8) Treatment may need to be reviewed.
4-7 mmol/l	**Normal** (good control)
7 -10 mmol/l	**Slightly elevated.** Treatment may require review.
11 - 17 mmol/l	**Elevated.** Continue to check before each meal and before sleep at night. Treatment requires review.
Greater than 17 mmol/l	**Substantially Elevated.** Contact medical team urgently. Check for ketones for patients with Type 1 diabetes or treated with Sodium-Glucose Co-Transporter 2 inhibitors. (SGLT2) Ensure if ketone meter requested for testing outside areas ketone meters held, that these are booked out (with patient details) the patient must be tested by employees trained and competent to use the meter and aware of responses to test results Recheck in two hours. If persistent report results to doctors.

Patients may have agreed alternative blood glucose ranges from those specified above, these ranges and corresponding actions and rationale should be clearly documented in the medical notes.

2.3 Equipment

The following equipment should be present in the blood glucose monitoring work stations for use by staff trained specifically in blood glucose monitoring:

- Trust approved blood glucose meter
- Blood glucose strips for approved meter
- Quality control (QC) record book (correctly identifying Serial Number for recorded device)
- Internal QC solution
- Cotton wool/gauze
- Single patient use lancet device
- Non-sterile examination gloves.

2.3.1 Other Equipment

- Clinell® Universal/sporicidal wipes if necessary as per policy.
- Relevant clinical waste bag (Waste Policy –(Ref 9))
- Designated sharps container (Safe Handling & Disposal of Sharps Policy- (Ref 5))

2.4 Procedure

Employees must attend blood glucose meter training via the academy and complete Blood glucose monitoring competency (Ref 1) to complete blood glucose monitoring.

	Action	Rationale
1	Check Internal QC sample • Daily for high use areas (wards). • Weekly and before each patient contact if not QC tested in the previous 24 hours in low use areas (Outpatient Clinics and Community areas). • On replacement of pot of strips. • If device dropped Instructions as per meter Operators manual.	• To ensure the system is working accurately.
2	Check blood glucose monitor is visibly clean. If unclean then clean prior to use.	• To ensure patient equipment is clean prior to use.
3	Undertake hand hygiene (Ref 4) Gloves must be worn when taking blood.	• To minimise risk of cross-contamination and prevent blood contamination to employee
4	Explain procedure to patient and gain verbal consent. (Consent for Medical Treatment for All Patients at the Great Western Hospital Policy - (Ref 10))	• Any record of consent be it verbal, non-verbal or in writing must be evidenced as being informed consent. I.e. the patient is fully aware (been given the relevant info and had the opportunity to discuss) of the duration, effects, purpose of a particular treatment and also the consequences of deciding not to have the treatment. • If it is apparent that a patient may lack the capacity to consent to the procedure, they MUST be tested via the two stage capacity assessment .If the patient is deemed to lack capacity a best interests decision record should be completed by the decision maker. Exceptions would be

		if the patient is unconscious or has an altered mental state and the test is required in an emergency to provide lifesaving treatment.
5	• Advise patient to wash and dry their hands, preferably with warm water, and rinse well if using soap. • Do not use alcohol gel or alcohol swab. • If patient not independent, support with the above, and then undertake staff member hand hygiene again (Ref 4)	• Washing prevents inaccurate results from contamination. • Washing in warm water improves blood flow. • Residual soap or alcohol gel may alter result.
6	Prime Trust approved single use lancing device.	• A new lancing device must be used to prevent cross infection.
7	Remove blood glucose strip from pot and close pot immediately.	• Blood glucose strips will deteriorate if exposed to light and moisture. • They should only be stored in the manufacturers' pots and not transferred to another container.
8	Insert test strip into the meter and follow on screen instructions	• To ensure the blood glucose strip is appropriate for the meter being used.
9	• Apply non sterile examination gloves. Choose finger to be pricked, ensure rotation of fingers and to avoid use of the finger pad or fingertip. • The sides of the fingers are the most appropriate area to use. • Avoid using thumb and index finger. • Immediately dispose of used lancet in sharps bin	• The sides of the fingers are the least painful area to use. • The finger pad or finger tips are more sensitive and contain more nerve receptors. • Repeated use of these areas can contribute to desensitisation and potential nerve ending damage.
10	• Wait five to ten seconds. • Keeping the patients hand lower than the heart massage the finger from base to tip to allow formation of a drop of blood if not freely flowing.	• Squeezing the finger immediately will constrict the capillaries and reduce the flow of blood. • Firm squeezing of the finger has been shown to affect the reading due to increased plasma escape.
11	• Bring the tip of the blood glucose test strip to touch the drop of blood, the meter will alert once enough blood is provided. • Leave test strip in meter until result is displayed.	• Removing the blood glucose strip prior to alert confirming adequate blood application will create an error message and the test will need to be repeated.
12	Apply clean cotton wool/gauze/tissue to bleeding site until bleeding stops.	• To stop blood flow.
13	• Remove the strip from the meter and dispose in a clinical waste bin. • Turn the meter off. • Remove gloves and wash hands.	• To maintain hand hygiene and Disposal of clinical waste to reduce any risk of blood cross contamination.
14	• Record result and take appropriate action as per **Table 1 – Section 2.2** recommendations • If **'HI'** is displayed the result will be greater than 33.3mmol/l • If **'LO'** is displayed the result is less than	• Any unexpected result should be repeated. If this result does not reflect the clinical picture / patient condition then a venous sample can be sent to the laboratory for estimation. • This **should not** delay appropriate

	0.6mmol/l	treatment if the patient is symptomatic of either hypoglycaemia of hyperglycaemia.
15	Clean meter after each use with Clinell Universal/sporicidal wipes / cleaning solution as per Cleaning and Decontamination of Patient Equipment care policy. (Ref 3)	• To reduce risk of cross contamination, spread of infection.

2.5 Contra-Indications and Test Interferences

It is not recommended to test capillary (finger stick) blood glucose on persons with:

- Peripheral circulatory failure
- Intravenous infusion of ascorbic acid
- Pre-eclampsia
- Paracetamol overdose.
- Severe dehydration as a result of :
    - Diabetic KetoAcidosis (DKA)
    - Hyperglycaemic-hyperosmolar state with or without ketosis
    - Shock
    - Severe hypotension
    - Peripheral vascular disease

Refer to the operator's manual for specific test interferences

Blood can be obtained from alternative sites such as ear lobes if unable to test fingers as the primary testing site, seek advice from the Diabetes Specialist Nurse (DSN) team to obtain alternative site testing advice and support.

Blood glucose levels can be obtained from other devices such as the blood gas analyser however training appropriate to this device should be completed.

2.6 Training

Training education sessions will be provided by The Medical Device Training Team or the relevant company trainer supported by the Diabetes Specialist Nurses. Updates will be provided as required according to the Medical Device Training Policy (Ref.11).

Student nurses can be trained to use the meter in their second year of training provided they have attended the university second year diabetes lecture, completed the Trust's meter specific blood glucose training and clinical competency (direct supervision) and only then under indirect supervision from a qualified employee

Health-care support workers with a National Vocational Qualification (NVQ) level 2 or above and Trainee Assistant Practitioners (TAPs) must also attend the DSN led diabetes study session.

Individual blood glucose meter operation education should initially be provided during a mandatory face to face training session.

3 Monitoring Compliance and Effectiveness of Implementation

The arrangements for monitoring compliance are outlined in the table below: -

Measurable policy objectives	Monitoring or audit method	Monitoring responsibility (individual, group or committee)	Frequency of monitoring	Reporting arrangements (committee or group the monitoring results is presented to)	What action will be taken if gaps are identified
External Quality Control 100 percent (%) compliance	Control solution sent to individual areas	Point of Care Testing (POCT) lead	Every three months.	Ward managers, Matrons, POCT group	If abnormal results identified. Meter will be removed and replaced
Internal Quality Control 100% compliance	Quality control solution	Individual Blood glucose meter users.	Daily QC in high use areas. In low use areas weekly QC and before individual patient test if this has not been completed in previous 24 hours.	Ward Mangers	If abnormal results Check QC solution and blood glucose strips are in date. Discontinue using meter and request replacement from Ext 5188. Inform POCT lead

4 Duties and Responsibilities of Individuals and Groups

4.1 Chief Executive

The Chief Executive is ultimately responsible for the implementation of this document.

4.2 Ward Managers, Matrons and Managers for Non Clinical Services

All Ward Managers, Matrons and Managers for Non Clinical Services must ensure that employees within their area are aware of this document; able to implement the document and that any superseded documents are destroyed.

4.3 Document Author and Document Implementation Lead

The document Author and the document Implementation Lead are responsible for identifying the need for a change in this document as a result of becoming aware of changes in practice, changes to statutory requirements, revised professional or clinical standards and local/national directives, and resubmitting the document for approval and republication if changes are required.

4.4 Target Audience

The target audience has the responsibility to ensure their compliance with this document by:

- Ensuring any training required is attended and kept up to date.
- Ensuring any competencies required are maintained and sent for Electronic Staff Record (ESR) Recording.
- Co-operating with the development and implementation of policies as part of their normal duties and responsibilities.

5 Further Reading, Consultation and Glossary

5.1 References, Further Reading and Links to Other Policies

The following is a list of other policies, procedural documents or guidance documents (internal or external) which employees should refer to for further details:

Ref. No.	Document Title	Document Location
1	GWH Measurement of patients blood glucose levels using the Roche Accuchek Performa for all clinical staff at GWH – Clinical competency	T Drive: Trustwide Documents Academy Dept
2	Aseptic Non Touch Technique Policy.	T Drive: Trustwide Documents
3	Cleaning and Decontamination of Patient Care Equipment Policy.	T Drive: Trustwide Documents
4	Hand Hygiene and Skin Care Policy	T Drive: Trustwide Documents
5	Safe Handling & Disposal of Sharps Policy Trustwide	T Drive: Trustwide Documents
6	Standard Infection Control Prevention and Control Precautions Policy.	T Drive: Trustwide Documents
7	Prevention & Management of Hypoglycaemia of the Newborn Policy	T Drive: Trustwide Documents
8	HYPOBOX: Treatment of Hypoglycaemia- Inpatient care.	Diabetes GWH Intranet page- Useful Documents.
9	Waste Policy.	T Drive: Trustwide documents
10	Consent for Medical Treatment for All Patients at the Great Western Hospital Policy	T Drive: Trustwide documents
11	Medical Device Training Policy	T Drive: Trustwide Documents
12	GWH Mental Capacity Act 2005 Policy and Procedures document	T Drive: Trustwide Documents
13	Type 2 diabetes in adults: management NICE guideline [NG28]	https://www.nice.org.uk/guidance/ng28
14	Type 1 diabetes in adults: diagnosis and management NICE guideline [NG17]	www.nice.org.uk/guidance/ng17

5.2 Consultation Process

The following is a list of consultees in formulating this document and the date that they approved the document:

Job Title / Department	Date Consultee Agreed Document Contents
Infection Prevention and Control	25.05.21
Divisional Manager (USC)	11.05.21
Mercury Ward manager	04.05.21
Diabetes Specialist Nurse	30.05.21
POCT lead	11.05.21
Medical Device Training Lead (Academy)	04.05.21

6 Equality Impact Assessment

An Equality Impact Assessment (EIA) has been completed for this document and can be found at Appendix A.

Appendix A - STAGE 1: Initial Screening For Equality Impact Assessment

At this stage, the following questions need to be considered:			
1	What is the name of the policy, strategy or project? **Blood Glucose Estimation (Adults & Children) Trustwide Policy and Procedure**		
2.	Briefly describe the aim of the policy, strategy, and project. What needs or duty is it designed to meet? **To provide guidance for all staff required to test a patient's blood glucose level safely and understand the implications of an abnormal result and appropriate actions to be taken.**		
3.	Is there any evidence or reason to believe that the policy, strategy or project could have an adverse or negative impact on any of the nine protected characteristics (as per Appendix A)?		**No**
4.	Is there evidence or other reason to believe that anyone with one or more of the nine protected characteristics have different needs and experiences that this policy is likely to assist i.e. there might be a *relative* adverse effect on other groups?		**No**
5.	Has prior consultation taken place with organisations or groups of persons with one or more of the nine protected characteristics of which has indicated a pre-existing problem which this policy, strategy, service redesign or project is likely to address?		**No**

Signed by the manager undertaking the assessment	Mel Curtis
Date completed	15.07.21
Job Title	Diabetes Matron

On completion of Stage 1 required if you have answered YES to one or more of questions 3, 4 and 5 above you need to complete a STAGE 2 - Full Equality Impact Assessment

Equality Impact Assessment

Are we Treating Everyone Equally?

Define the document. What is the document about? What outcomes are expected?

Consider if your document/proposal affects any persons (Patients, Employees, Carers, Visitors, Volunteers and Members) with protected characteristics? Back up your considerations by local or national data, service information, audits, complaints and compliments, Friends & Family Test results, Staff Survey, etc.

If an adverse impact is identified what can be done to change this? Are there any barriers? Focus on outcomes and improvements. Plan and create actions that will mitigate against any identified inequalities.

If the document upon assessment is identified as having a positive impact, how can this be shared to maximise the benefits universally?

Trust Equality and Diversity Objectives

Better health outcomes for all	Improved patient access & experience	Empowered engaged & included staff	Inclusive leadership at all levels

Our Vision

Working together with our partners in health and social care, we will deliver accessible, personalised and integrated services for local people whether at home, in the community or in hospital empowering people to lead independent and healthier lives.