

# HYWEL DDA UNIVERSITY HEALTH BOARD



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University Health Board

## Blood Glucose Testing Best Practice Guideline (In-Patient, Emergency & CDU Areas)

<b>Policy Number:</b>	413	<b>Supersedes:</b>		<b>Standards For Healthcare Services No/s</b>	7,17
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Version No:	Date Of Review:	Reviewer Name:	Completed Action:	Approved by:	Date Approved:	New Review Date:
1.0	March 2015	Chris Cottrell	New document	CPRG	7.9.2015	7.9.2018
	November 2018	Chris Cottrell	Extended pending AW guidance	CWCDG Chair	19.11.2018	19.7.2019

<b>Brief Summary of Document:</b>	This guideline aims to ensure the safest and best practice for staff and patients when blood glucose testing is undertaken in in-patient, emergency & CDU areas across Hywel Dda University Health Board. Adherence to the guideline will help to ensure accurate readings and recordings of blood glucose levels in patients requiring blood glucose testing.
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<b>To be read in conjunction with:</b>	329 - Point of Care Testing Policy 268-Medicines Policy-Appendix J Guidelines for Self-administration of Patients Own Insulin. Addendum to Guidelines for the Self-administration of Patients Own Medicines
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<b>Classification:</b>	Clinical	<b>Category:</b>	Guideline	<b>Freedom Of Information Status</b>	Open
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<b>Authorised by:</b>	Caroline Oakley	<b>Job Title</b>	Director of Nursing and Midwifery & Patient Experience	<b>Signature:</b>	A signed copy of this document is stored with Corporate Services
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<b>Scope</b>	<b>ORGANISATION WIDE</b>	<input checked="" type="checkbox"/>	<b>DIRECTORATE</b>	<input type="checkbox"/>	<b>DEPARTMENT ONLY</b>	<input type="checkbox"/>	<b>COUNTY ONLY</b>	<input type="checkbox"/>
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<b>Staff Group</b>	Administrative/ Estates	<input type="checkbox"/>	Allied Health Professionals	<input checked="" type="checkbox"/>	Ancillary	<input type="checkbox"/>	Maintenance	<input type="checkbox"/>
	Medical & Dental	<input checked="" type="checkbox"/>	Nursing	<input checked="" type="checkbox"/>	Scientific & Professional	<input checked="" type="checkbox"/>	Other	<input checked="" type="checkbox"/>

<b>CONSULTATION</b>	<b>Please indicate the name of the individual(s)/group(s) or committee(s) involved in the consultation process and state date agreement obtained.</b>			
	<b>Individual(s)</b>	Assistant Director of Nursing Practice Directorate Nurse Unscheduled Care Diabetes Specialist Nurse Directorate Nurse Lead: Scheduled Care Pathology Quality Manager	<b>Date(s)</b>	September 2014
	<b>Group(s)</b>	ThinkGlucose Steering Group; Senior Nurse Managers meeting. Adult Diabetes Specialist Team Paediatric Diabetes Specialist Team.	<b>Date(s)</b>	September 2014.
	<b>Committee(s)</b>	ThinkGlucose Steering group	<b>Date(s)</b>	September 2014

<b>RATIFYING AUTHORITY</b> (in accordance with the Schedule of Delegation)	<b>KEY</b>		<b>COMMENTS/ POINTS TO NOTE</b>
<b>NAME OF COMMITTEE</b>	A = Approval Required	Date Approval Obtained	
	FR = Final Ratification		
Clinical Policy Review Group	A	7.9.2015	28.4.15 approved pending chair's action following recommended changes

<b>Date Equality Impact Assessment Undertaken</b>	28 <sup>th</sup> October 2014	<b>Group completing Equality impact assessment</b>	Jackie Hooper
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<b>Please enter any keywords to be used in the policy search system to enable staff to locate this policy</b>	Blood Glucose Testing
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Document Implementation Plan			
How Will This Policy Be Implemented?	An awareness raising programme has been undertaken to ensure all relevant clinical staff are aware of this new guideline (meetings with Senior Nurses, Diabetes Specialist Teams have been conducted). At time of document approval, education and awareness has been provided to 75% of the nursing staff in Prince Philip Hospital; education is currently being rolled out across Glangwili Hospital; this will be extended to all sites in HDUHB once approval of the guideline is imminent.		
Who Should Use The Document?	All clinical staff undertaking blood glucose monitoring.		
What (if any) Training/Financial Implications are Associated with this document?	Rolling programme of training and education across the Health Board and managers on each ward will be involved in cascading training.		
What are the Action Plan/Timescales for implementing this policy?	<b>Action</b>	<b>By Whom</b>	<b>By When</b>
	Global Emails/Intranet	FH/CC	February 2015
	Further actions to be agreed by Acute Services Medical Director and Head of Nursing following Global Consultation amends	CC	February 2015
	Awareness sessions in Witybush Hospital	LA	Throughout 2015
	Awareness sessions in Bronglais Hospital	CE/LP	Throughout 2015
	Awareness sessions in Community Hospitals.	CC	Throughout 2015
	Awareness sessions in Glangwili Hospital	IR/RD	Throughout 2015
	Awareness sessions in Prince Philip Hospital	DT/KW	Throughout 2015

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## 1. INTRODUCTION

Approximately 1 in 7 patients admitted to hospital within Hywel Dda have a diagnosis of diabetes (NADIA 2013). It is vital that all clinical staff required to monitor blood glucose are able to perform the procedure of blood glucose testing to enable safe and accurate monitoring of blood glucose levels.

The guideline is aiming to improve and standardise current practice on blood glucose testing within Hywel Dda to ensure as far as possible the performance and monitoring of blood glucose testing meets the standards set out in the following documents:

- All Wales Point of Care Testing Policy (329)
- Adult Diabetic Ketoacidosis Care Bundle
- Guidelines for Self-administration of Patients Own Insulin
- Addendum to Guidelines for the Self-administration of Patients Own Medicines.

## 2. STATEMENT

The purpose of this guideline is to provide a clear framework to enable all healthcare professionals to perform blood glucose testing and monitoring for patients and improve and standardise clinical practice within Hywel Dda UHB.

## 3. SCOPE

This guideline must be followed by all healthcare professionals involved in the provision of blood glucose testing and monitoring for patients within Hywel Dda UHB. Ketone testing is only to be performed by registered healthcare professionals.

This guideline applies to all patients (adults and children) who are staying in an emergency unit, a clinical decision unit or an in-patient ward. In this guideline, the term 'in-patient area' refers, unless otherwise stated, to emergency units, clinical decision units, and in-patient wards; and the term 'patient' refers to a person who is assessed, treated or cared for in these areas, unless otherwise stated.

For all adult patients who self-test their blood glucose using their own blood glucose (BG) meter, who have been assessed as competent to do so, they can continue to self-test and record in their usual manner whilst they are in hospital. Where healthcare professional undertake blood glucose testing; they should use the hospital approved BG meter as described in this guideline.

For all children and young people under the Paediatric Diabetes Specialist Team, refer to the 'Paediatric Diabetes Handbook'. The philosophy of care is that the child or young person and their families maintain care of their diabetes whilst in hospital if they are able to do so. In the situation where healthcare professionals are undertaking blood glucose tests; they should use the hospital approved BG meter as described in this guideline and refer to the 'Paediatric Diabetes Handbook' regarding further management.

## 4. AIM

The aim of this guideline is to provide clear guidance and standardisation on blood glucose testing and monitoring procedures based on national guidance to ensure a consistent approach to the care of patients who require blood glucose testing/monitoring as in-patients within Hywel Dda.

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## 5. OBJECTIVES

The aim of the guideline will be achieved through the following objectives:

- Provide a holistic and standardised approach to blood glucose testing and monitoring to improve quality of care.
- Improve safety by ensuring the procedure is performed safely by reducing clinical errors.
- Improve accuracy of monitoring procedures.
- Provide assurance that blood glucose readings are as reliable as far as possible because correct procedures have been followed.
- Provide an environment for staff learning and development.

## 6. TRAINING REQUIREMENTS

Only healthcare professionals that have been trained and assessed by an approved assessor should perform this procedure. Ketone testing is only to be performed by registered healthcare professionals.

Refresher/update training must be undertaken every two years.

## 7. BLOOD GLUCOSE TESTING

### 7.1 Contraindications

Capillary blood testing may not be appropriate for persons with decreased peripheral blood flow, as it may not reflect the true physiological state. Examples include, but are not limited to:

- Severe dehydration
- Shock and hypotension
- Hypothermia
- Diabetic Ketone-Acidosis (DKA) / Hyperosmolar Hyperglycaemic State (HHS)
- Peripheral vascular disease

**In such circumstances, a venous sample of blood should be sent to the laboratory for testing to ensure accuracy.**

### 7.2 Equipment

Assemble the following equipment:

- Blood glucose meter (At April 2015 Nova)
- Test strip
- Self retracting lancet device
- Cotton wool
- Sharps box

Check the BG meter is intact and working (as per manufacturer's instructions).

Check the BG meter has the correct time, date and year.

Check the expiry date/date of discard on the test strip container. If the expiry/discard date has passed or has not been completed, the test strips should not be used and they should be disposed of. A new container of test strips must be used and the date of opening & discard date should be completed.

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A daily (24 hour minimum) Quality Control (QC) test must be carried out, preferably during the night shift.

When carrying out the QC test, always place the BG meter on a flat surface when applying QC solution to the test strip. Remove the test strip from the meter to read the result; do not pick up the meter before removing the test strip. All readings from the BG meter will be sent back electronically automatically to the Biochemistry Department.

If the BG meter is not working or appears to give one unexpectedly high/low reading and which, on retesting the patient, then produces a different (more expected) reading, then you must contact the Biochemistry Department for advice on action to take.

### 7.3 Undertaking the Blood Glucose test

Personal Barcodes which are issued on a named basis only are not to be shared under any circumstances<sup>1</sup>.

During an emergency, if the patient's hospital number is not available the designated emergency ID number or patient's name should be entered into the glucose meter. A note must be entered in the comments (see below).

- Explain the procedure to the patient and gain their verbal consent where possible.
- Patients must wash their hands prior to the test. Any deposits on patients' hands can affect readings. Ensure the patient's hands are completely dry before testing. **DO NOT** use alcohol wipes to clean the sites as this can affect readings.
- Staff should also wash their hands and ensure they are completely dry before putting gloves on.
- **Scan Personal Barcode once**
- Scan blood glucose test strip once
- Scan / enter patient number into machine

Use a self retracting single use lancet device

Check with the patient their preferred finger.

Avoid using the index finger and thumb as frequent puncture at these sites can damage the skin, which may lead to loss of sensation and poor grip. Use only the sides of the fingers (to avoid the pads of the fingers becoming hard over long term use).

Prick the site using the lancet.

Dispose of lancet in the sharps disposal box.

Take the BG meter (with the blood glucose test strip already inserted) to the puncture site and allow the blood to be 'syphoned' via capillary action up in to the test strip.

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Once the reading is accepted, comments can be added within the BG meter.

Use the cotton wool to apply pressure to ensure any bleeding has stopped.  
Dispose of blood glucose test strip correctly.

Press 'Accept' on BG meter to log result, dock to download the result.

**NB:** If a blood glucose result of  $<3$  mmol/L or  $>20$  mmol/L is obtained, a venous sample MUST then be taken and sent to the biochemistry laboratory to confirm results but in the event of hypoglycaemia, the priority should be to treat the hypoglycemic event as per protocol<sup>1</sup>. Further blood glucose testing to monitor treatment can be undertaken using the BG meter.

Abnormal readings should be reported to the Doctor/Diabetes team, documented on the blood glucose monitoring chart and in the patient medical/nursing notes with a record of action taken and by whom.

**All blood glucose readings recorded by a Health Care Support Worker must be reviewed by a Registered Nurse.**

## 7.4 Documentation

Only enter blood glucose result on NEWS (Track and Trigger) Chart of patients with acutely altered mental states or on a chart approved within your clinical area e.g. PEWS Chart (paediatrics).

For patients not on insulin, document blood glucose results on the new blood glucose monitoring chart (refer to Appendix 1 for adults & Appendix 2 for paediatrics).

Patients on subcutaneous / intravenous insulin - document blood glucose results on the All Wales insulin chart / insulin intravenous infusion chart.

Patients on oral hypoglycaemic medication or on subcutaneous insulin, use the new HDUHB blood glucose monitoring chart. This is either as a separate chart or on the back of the Diabetes Medication Chart which is being developed and piloted on various wards in HDUHB from April 2015.

All entries should be signed, timed and dated (use a 24 hour format – time taken from BG meter used).

All blood glucose readings recorded by a Health Care Support Worker must be reviewed by a Registered Nurse.

When patients record their own blood glucose, this must be recorded in their usual manner (e.g. blood glucose or diabetes diary or BG meter memory).

## 8 BLOOD GLUCOSE MONITORING FREQUENCY

Refer to Appendix 3.

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All in-patients with a known diagnosis of diabetes (whether this is the reason for their admission or not) **MUST** have their blood glucose checked within the first hour of admission.

All in-patients with a known diagnosis of diabetes should have their blood glucose checked at least 4 times a day for the first 48 hrs following admission and the frequency should be reassessed and clearly prescribed on the blood glucose monitoring chart.

Patients (with diabetes) who become unwell at any time during their admission should be monitored at least 4 times a day and reassessed after 48hrs.

Preferred timing of these tests should be in accordance with the blood glucose frequency flow chart (refer to Appendix 3)

Patients on insulin infusions (variable or fixed rate infusions) should have hourly blood glucose monitoring. This may be reduced (during the night) to 2 hourly if blood glucose readings have been stable for at least 3 consecutive readings (at least an hour apart).

Patients using their usual prescribed insulin (pen device or pump therapy) and assessed as competent to self manage their insulin therapy (self management policy<sup>2</sup>) should be testing at least twice a day and up to four times a day or more (Appendix 1 applies to adults only; see Paediatric Diabetes Hand Book).

After 48hrs of monitoring and following reassessment, blood glucose monitoring should be aligned to the blood glucose monitoring chart (refer to Appendix1 for adults; Appendix 2 for paediatrics).

When patients record their own blood glucose, this must be recorded in their usual manner (e.g. blood glucose or diabetes diary or BG meter memory).

If unsure seek advice from the Diabetes team.

## 9 IMPLEMENTATION

This guideline will be distributed through the nursing and medical structures and via the Hywel Dda University Health Board intranet site.

A rolling program of education supporting the implementation of this document has been identified. A range of training will be provided including ward-based training and study days.

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## 10 FURTHER INFORMATION

National Diabetes Inpatient Audit (NaDIA)

ThinkGlucose

## 11 AUDIT AND EVALUATION

An audit is conducted annually on blood glucose testing and monitoring procedures within Hywel Dda UHB. The audit measures and evaluates the following outcomes:

- Staff performing the procedure (to ensure the bar code is consistent with person performing the procedure )
- Total number of patient contacts requiring blood glucose testing/monitoring on the day
- Reconciliation of data (POCT team) to match data from blood glucose monitor to data entry on blood glucose monitoring charts (Appendix 1 for adults & Appendix 2 for paediatrics)
- Measure frequency of monitoring and reconcile to blood glucose monitoring frequency chart (flow chart) (Appendix 3)
- Monitoring charts are signed and dated accurately



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## Blood Glucose Monitoring Guidance for In-Patients

1. Staff must be trained and assessed by an approved assessor should perform blood glucose monitoring.
2. **DO NOT SHARE YOUR BARCODE UNDER ANY CIRCUMSTANCES.**
3. REMEMBER-patient's hands MUST be washed prior to checking blood glucose to ensure accurate readings.
4. Ensure that blood glucose results are documented accurately on chart and remember to complete time (from meter display) using 24 hr clock format, date and sign legibly.
5. For advice on blood glucose monitoring frequency please refer to Blood Glucose Monitoring Flow Chart (October 2014)
6. If insulin charts in use in your ward area then please use the monitoring chart on the back of the insulin chart.
7. If unsure, seek advice from the Diabetes Specialist Team – this is guidance and should not replace clinical decision making.

### FOR PATIENTS WITH KNOWN DIAGNOSIS OF DIABETES

1. A patient with known diagnosis of diabetes, whether this is the reason for admission or not, MUST have their blood glucose level checked within 1 hour of admission to Hospital.
2. All patients with diabetes should be assessed using the ThinkGlucose criteria. If referral to Consultant, DSN or member of Diabetes Specialist Team is indicated, complete appropriate referral form and notify the person to whom the referral is being made and insert the ThinkGlucose sticker into the medical notes.
3. Blood glucose levels must be checked **at least** 4 times a day for the first 48 hours, then reassess appropriate frequency according to individual needs. If the patient's condition is unstable, more frequent blood glucose testing may be required.
4. Any abnormal readings, i.e. higher or lower than usual for the patient, test should be repeated to confirm. However, if the blood glucose is less than 4 mmol/l, with or without symptoms of hypoglycaemia, - treat using hypo algorithm in Hypobox.
5. **If the patient has type 1 diabetes and their blood glucose is above 11.0mmol/l consider checking for ketones. If ketones above 0.6 report to Dr in charge of the patients' care.**
6. **If the patient has type 2 diabetes and their blood glucose is above 16.9mmol/l consider checking for ketones. If ketones above 0.6 report to Dr in charge of the patients' care.**
7. **Abnormal readings must be reported to the Dr in charge of the patients' care.**

### FOR PATIENTS REQUIRING BLOOD GLUCOSE MONITORING (NOT DIAGNOSED WITH DIABETES)

Blood glucose levels within the range of 3.5 – 5.5mmol/l are considered 'normal' and therefore if the patient is not currently prescribed diabetes medication and has a recorded blood glucose level under 4.0mmol/l – this should not be treated as hypoglycaemia.

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## 13 APPENDIX 2 – BLOOD GLUCOSE MONITORING CHART (PAEDIATRICS)



<b>Frequency of Blood Glucose Monitoring- At least 4 times a day for first 48 hours then re-assess</b>										<i>Addressograph</i>									
Frequency following assessment:..... Date: ..... Time: .....Sig: .....																			
Frequency following assessment:..... Date: .....Time: .....Sig: .....																			
Frequency following assessment: ..... Date: .....Time: .....Sig: .....																			
Frequency following assessment:..... Date: .....Time: .....Sig: .....																			
	Date																		
	Test Tim																		
R Blood Glucose Level in mmol/L	28																		
	27																		
	26																		
	25																		
	24																		
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2																			
1																			
0																			
Recorder sig'																			
Band																			
Reviewer sig'																			
Band																			
Blood glucose mmol/l																			
Blood Ketone mmol/l																			

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## Blood Glucose Monitoring Guidance for In-Patients (Paediatrics)

8. Only staff trained and assessed by an approved assessor to perform blood glucose monitoring.
9. **DO NOT SHARE YOUR BARCODE UNDER ANY CIRCUMSTANCES.**
10. REMEMBER-patient's hands MUST be washed prior to checking blood glucose to ensure accurate readings.
11. Ensure that blood glucose results are documented accurately on chart and remember to complete time (from meter display) using 24 hr clock format, date and sign legibly.
12. If insulin charts in use in your ward area then please use the monitoring chart on the back of the insulin chart.
13. If unsure, seek advice from the Paediatric Diabetes Specialist Team (including the Paediatric Diabetes Specialist Nurse - PDSN) the same day or the next working day – this is guidance and should not replace clinical decision making.

### FOR PATIENTS WITH KNOWN DIAGNOSIS OF DIABETES

8. A child or young person with known diagnosis of diabetes, whether this is the reason for admission or not, MUST have their blood glucose level checked within 1 hour of admission to Hospital.
9. All children or young people with diabetes should be referred to the Paediatric Diabetes team responsible for their care on the same day or the next working day. Complete the appropriate Paediatric Diabetes Patient Admission Notification Form and notify the person to whom the referral is being made.
10. Blood glucose levels must be checked **at least** 4 times a day for the first 48 hours, then reassess appropriate frequency according to individual needs. If the patient's condition is unstable, more frequent blood glucose testing may be required.
11. Any abnormal readings, i.e. higher or lower than usual for the patient, test should be repeated to confirm. However, if the blood glucose is less than 4 mmol/l, with or without symptoms of hypoglycaemia, - treat using hypo algorithm in Hypobox.
12. **If the child/young person has type 1 diabetes and their blood glucose is above 11.0mmol/l consider checking for ketones. If ketones above 0.6 report to Dr in charge of the patients' care.**
13. **If the child/young person has type 2 diabetes and their blood glucose is above 16.9mmol/l consider checking for ketones. If ketones above 0.6 report to Dr in charge of the patients' care.**
14. **Abnormal readings must be reported to the Dr in charge of the patients' care.**

### FOR PATIENTS REQUIRING BLOOD GLUCOSE MONITORING (NOT DIAGNOSED WITH DIABETES)

Blood glucose levels within the range of 3.5 – 5.5mmol/l are considered 'normal' and therefore if the patient is not currently prescribed diabetes medication and has a recorded blood glucose level under 4.0mmol/l – this should not be treated as hypoglycaemia.

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## 14 APPENDIX 3 – BLOOD GLUCOSE MONITORING FREQUENCY GUIDANCE (ADULTS)

- See separate attachment