



## Blood glucose monitoring protocol

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Type of document	Standard Operating Procedure
Target audience	Community nursing staff in CWP - West Physical Health Services
Document purpose	Information for staff in the community who care for patients with diabetes who require blood glucose monitoring

### Document consultation

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CWP documents to be read in conjunction with	<a href="#">HR6</a> <a href="#">CP59</a> <a href="#">IC10</a> <a href="#">CP3</a>	Mandatory Employee Learning (MEL) policy Medical devices policy Infection, prevention and control policy Health records policy
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Training requirements	No - Training requirements for this policy are in accordance with the CWP Training Needs Analysis (TNA)
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Financial resource implications	No
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### Equality Impact Assessment (EIA)

Initial assessment	Yes/No	Comments
Does this document affect one group less or more favourably than another on the basis of:		
• Race	No	
• Ethnic origins (including gypsies and travellers)	No	
• Nationality	No	
• Gender	No	
• Culture	No	
• Religion or belief	No	
• Sexual orientation including lesbian, gay and bisexual people	No	
• Age	No	
• Disability - learning disabilities, physical disability, sensory impairment and mental health problems	No	
Is there any evidence that some groups are affected differently?	No	
If you have identified potential discrimination, are there any exceptions valid, legal and/or justifiable? N/A		
Is the impact of the document likely to be negative?	No	
• If so can the impact be avoided?	No	
• What alternatives are there to achieving the document without the impact?	No	
• Can we reduce the impact by taking different action?	No	
Where an adverse or negative impact on equality group(s) has been identified during the initial screening process a full EIA assessment should be conducted.		

If you have identified a potential discriminatory impact of this procedural document, please refer it to the human resource department together with any suggestions as to the action required to avoid / reduce this impact.

For advice in respect of answering the above questions, please contact the human resource department.

Was a full impact assessment required?	No	
What is the level of impact?	Low	

### Document change history

Changes made with rationale and impact on practice
1.

### External references

References
<ol style="list-style-type: none"> <li>Diabetes UK Position statement on self monitoring of glucose levels <a href="http://www.diabetes.org.uk/About_us/Our_Views/Position_statements/Self_monitoring_of_blood_glucose/">http://www.diabetes.org.uk/About_us/Our_Views/Position_statements/Self_monitoring_of_blood_glucose/</a></li> <li>International Diabetes Federation (IDF;2005) Clinical guides task force. Global guidelines for type 2 diabetes. IDF, Brussels</li> <li>MHRA Point of care testing advice leaflet</li> <li><a href="http://www.mhra.gov.uk/Publications/Postersandleaflets/CON2015499">http://www.mhra.gov.uk/Publications/Postersandleaflets/CON2015499</a></li> <li>NICE Diabetes guidelines (2002) <a href="http://www.nice.org.uk/guidance/index.jsp?action=byID&amp;o=10912">http://www.nice.org.uk/guidance/index.jsp?action=byID&amp;o=10912</a></li> </ol>

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## 1. Introduction

Monitoring of capillary blood glucose is recognised as playing an important role in the effective management of people with diabetes when it is used in the correct manner. Blood glucose monitoring provides instant information about the effectiveness of a person's diabetes management plan. It is important to monitor the blood glucose results of patients with diabetes to:

1. Monitor the effectiveness of diabetes therapy on a day to day basis.
2. Monitor effectiveness of lifestyle interventions.
3. Detect poor glycaemic control.
4. Detect hypoglycaemia.
5. Monitor glycaemic control during times of illness.

The purpose of this protocol is to ensure that blood glucose monitoring is carried out safely, accurately and by appropriately trained staff. It is also to augment the training sessions for CWP West physical health staff.

This protocol is for use with the Lifescan VERIO PRO + glucose meter ONLY and must be adhered to at all times.

Focus is put on individual responsibilities for staff to undertake Internal Quality Control (IQC) and External Quality Assurance (EQA) and systems have been put in place by CWP West to ensure best practice. It is a requirement that all staff who undertake blood glucose monitoring will ensure full compliance with the following protocol.

This protocol is applicable to all registered users in the following teams within CWP West:

- All District Nursing Teams including Out of hours staff / Twilight nursing;
- Intermediate Care staff;
- Community Matrons.

NHS Western Cheshire would like to thank Debbie Hicks (Nurse Consultant NHS Enfield) for allowing them to utilise her work to produce these guidelines.

## 2. Definitions

### How to become a registered user

Registered users are staff who have:

- Received training and completed the competency assessment form ([appendix 1](#)), organised by the Diabetes co-ordinator in collaboration with Lifescan representatives;
- Have received a certificate of training ([appendix 2](#));
- Completed and passed the 'safe use of insulin' training, <http://nhsdiabetes.healthcareea.co.uk/england>.

## 3. Training

Prior to being issued with a certificate of training and a blood glucose meter, all relevant staff will attend a training session that covers the following:

Training session will include	Objective of training
Full meter training to include routine maintenance and coding of meter	Basic principles of measurement Understanding of error codes and troubleshooting
Preparation of patient	Patient understanding, knowledge of contra-indications
Specimen collection and lancet training	Basic principles of measurement and correct technique for collection of samples. Correct technique for disposal of needles.
Application of the specimen to the meter	Correct technique and use of the meter
Procedure for reading and recording results	Accurate record keeping and knowledge of normal values

Training session will include	Objective of training
Dealing with abnormal or unexpected results	Understanding of quality control processes.
Quality control	Mechanism for coding, IQC and EQA
Health and Safety, especially cross infection	Relevant aspects of Health and Safety and Infection, Prevention and Control
EQA registration and procedure	Understanding of the importance of returning results
Ordering supplies	Understand how to ensure supplies are ordered correctly
Issue of training certificates and distribution of meters and log books	For evidence of attendance, portfolio

#### 4. Blood glucose testing meters

When using the meter, the following procedure should be carried out:

Procedure	Rationale
Use only One Touch VERIO test strips with One Touch VERIO PRO + meter	To ensure compatibility of strips and meter
Ensure meter and strips are: <ul style="list-style-type: none"> <li>Approximately the same temperature before you test;</li> <li>Testing is done within operating temperature range (10 – 44 °C) - try to test as close to room temperature as possible.</li> </ul>	To ensure accuracy of results
When opening test strips for the first time ensure they are within expiry date and label clearly when pot is opened for the first time	To ensure strips are valid and are not used after 6 months of opening
Wash and dry hands	To maintain hygiene. To maintain Infection, Prevention and Control Measures. To avoid contamination of strip
Insert a test strip into test port to activate meter	To activate meter on

#### 5. Quality assurance

The need for quality assurance and training in the use of blood glucose meters was acknowledged by Medicines and Healthcare Products Regulatory Agency (MHRA), 2011. The treatment of patients can be adversely affected by the use of blood glucose meters by untrained staff and without quality control procedures. It is the responsibility of each healthcare professional using a meter to ensure that Quality Assurance testing is carried out.

**Decisions regarding changes in patient treatment should not be made unless the meter used has been fully quality assured (EQA no more than 1 month ago and IQC within previous 24 hours)**

##### 5.1 Equipment for quality assurance monitoring.

- One Touch VERIO PRO + blood glucose meter;
- One Touch VERIO test strips;
- Sharps Bin;
- Gloves;
- Quality control test solution;
- QA diary;
- Single use lancet devices.

## 5.2 Internal Quality Control (IQC) using Control solution

This should be carried out daily if the meter is used on a daily basis. If the meter is used intermittently, it should be carried out weekly, or before being used for a patient test. IQC should also be performed if:

- The meter is dropped or receives a physical shock;
- The integrity of the strips is suspect;
- The function of the meter is suspect;
- An improbable result is obtained.

Results from IQC should be recorded in the meter log book which will be kept for 10 years. This test should be carried out using only the solution supplied by Lifescan. This will be given out on a three-monthly basis to CWP West staff who are registered users and who are enrolled in the Q Point Quality Assessment Scheme.

Procedure	Rationale
Ensure meter is in the OFF position	To start test
Insert a test strip to activate meter	To ensure meter is activated.
Activate test mode on machine as per manufacturer's instructions	To ensure differentiation between QC solution and blood sample
Prepare and apply control solution	To carry out test
Read and record result in log book	To ensure audit trail and good record keeping
Check results are in range (see strip vial)	To ensure meter and strips are working properly

## 5.3 External Quality Assurance (EQA)

CWP West works closely in collaboration with Q Point and Lifescan to ensure that all meters in use within CWP West - Physical Health services are fully monitored.

- It will be the responsibility of the team leader to keep an up to date log / register of all users (see [appendix 3](#));
- If a member of the team leaves, the allocated meter will be withdrawn from use in the following way:
  - The meter history log book ([appendix 4](#)) will be completed and retained by team leader and Q Point will be informed;
  - The meter will be returned to a central holding bank, community nursing department, 1829 Building.
- All new staff will undertake a training session by the designated trainer on induction and added to the EQA register and Lifescan informed. This process is outlined in "How to become a registered user";
  - Monthly returns from Q Point will be sent to community nursing department, 1829 Building.

## 6. Procedure for blood glucose meter use

The correct technique for collection of capillary blood glucose samples is important to:

- Generate accurate results;
- Prevent infection;
- Prevent permanent injury in cases of long term monitoring.

The following procedure should be adhered to at all times.

### Equipment:

- One Touch VERIO PRO + blood glucose meter;
- One Touch VERIO test strips;
- Unilet single use lancing device;
- Sharps container;

- Cotton wool / gauze swabs;
- Gloves;
- Patient record.

Procedure	Rationale
Identify patient, obtain consent and cooperation	To ensure correct identity, gain informed consent and understanding
Wash and dry your hands, apply gloves and apron	To maintain hand hygiene and prevent cross infection and adhere to infection, prevention and control measures.
Ensure that patient has washed hands in warm soapy water Ensure hands are rinsed well and completely dry	Warming fingers can increase blood flow Many household products can affect blood glucose readings
Remove testing strip from pot and replace lid immediately	To prevent deterioration of remaining strips
Insert test strip into meter	To ensure compatibility of strips and meter
Use Unilet lancing device and puncture finger on the side of the fingertip (outer aspect)	Less painful To prevent damage to nerve endings in fingertips
Gently squeeze or massage fingertip to get a round drop of blood If the blood smears do not use this sample Dry the area and gently squeeze another drop of blood, if still not effective, puncture a new site with a new lancet	To ensure correct sample size obtained
Apply blood sample as per manufacturer's instructions	To ensure accuracy of reading
Apply pressure on cotton wool or gauze to puncture site	To stop blood flow from finger
Read result and take action if outside target range	To ensure prompt treatment of hypo and hyperglycaemia.
Record results in patient record and meter log book	Good record keeping and to ensure an audit trail

## 7. Storage of glucose meter, strips and quality control solutions.

Staff are issued with a One Touch VERIO PRO + meter. This meter should ideally be carried in the Lifescan workstation or meter wallet.

The workstation / meter wallet should be stored in a cool, dry place between 6 - 44°C but it should not be refrigerated. It is essential to be cautious when carrying the workstation / meter wallet in a vehicle, as it can be prone to extremes of temperature. A dust free environment is essential. The workstation / meter wallet should be kept away from direct sunlight and heat.

When staff are using the test strip vial and the control solution vial, it is essential to close the vial immediately after use to avoid contamination and damage.

Test strips should be stored in their original vial only and the "in use" date (date when opened) should be clearly labelled on the vial on the appropriate line. Any unused test strips in the vial should be disposed of after the "in use" date. The "in use" date is 6 months after the vial has been opened for the first time.

All registered users will be sent a control solution every three months. It is essential to replace the control solution three monthly when it is received. The date opened should be written on the vial.



## 8. Frequency of blood glucose monitoring

Each request for blood glucose monitoring should be assessed on an individual basis. The frequency of blood glucose monitoring should be based on the professional judgement of the Registered Nurse.

The guidelines below (Guidelines for home visits by Community Nurses to perform capillary blood glucose monitoring alone) will help to assess the indications for blood glucose monitoring.

It is, however, expected that blood glucose monitoring should take place in the following circumstances:

- Prior to insulin injection;
- If hypoglycaemia is suspected;
- If hyperglycaemia is suspected;
- Patient found unwell or confused.

## 9. Guidelines for home visits by community nurses to perform capillary blood glucose monitoring alone

Community Nurses are requested to do home visits on patients to perform random blood glucose monitoring. This is a valuable service but potentially very time consuming. To ensure appropriate utilisation of Community Nurses' time in this area the following guidance has been formulated for consideration.

Criteria for performing blood glucose monitoring	Rationale
Baseline information prior to request	To ascertain previous medical history
The patient should have a confirmed diagnosis of diabetes	No clinical indication for home blood glucose monitoring in non-diabetic patients. Home blood glucose monitoring cannot be utilised to make a formal diagnosis of diabetes
Current HbA1c (within the last 8 – 12 weeks)	HbA1c is the recommended method of long term monitoring of diabetes control (NICE 2013) HbA1c gives an indication of control over the preceding 8-12 weeks
Capillary monitoring provides additional information not available from HbA1c monitoring	HbA1c is the recommended method of long term monitoring of diabetes control (NICE 2002)
Concerns regarding hypoglycaemia	Home blood glucose monitoring can help to identify specific times when hypoglycaemia may be a high risk and assist in identifying which treatment requires adjusting
Significant treatment change	Home blood glucose monitoring can provide immediate information re the effectiveness of treatment adjustment
Significant change in patient's medical condition	Acute fluctuations can occur in patient's blood sugar profiles during episodes of acute illness requiring treatment adjustment
Supporting the patient in achieving self-blood glucose monitoring	Self-blood glucose monitoring is the preferred option but some patients may require a period of support to achieve independence
Specified time-frame, e.g. 2 weeks	Indefinite home blood glucose monitoring without review is of no clinical benefit and potentially a waste of valuable community nursing resources
Pattern of monitoring specified, e.g. daily, twice per day	Timing of blood glucose monitoring is important for readings to be of any value. Ideally, including pre- and post-meal tests
Named reviewer and date specified at the time of the request	Blood glucose results need to be reviewed by an appropriate health care professional who has the knowledge to adjust relevant treatments if required



## 10. Strip ordering

The clinical lead / managerial lead will need to ensure that there are enough strips and lancets available for the number of people with diabetes on the team caseload who require blood glucose monitoring.

Ordering of strips can be ordered through the locality ordering coordinator (0151) 350 3306.

**Do not take strips from one vial and place in another vial.**

Lancet devices are to be ordered through NHS Logistics online.

## 11. Treatment of Hypoglycaemia

Hypoglycaemia (hypo) is when blood glucose levels are low, falling to below 4mmol/l

Signs and symptoms:

- Feeling shaky;
- Sweating;
- Hunger;
- Tiredness;
- Blurred vision;
- Lack of concentration;
- Headaches;
- Feeling tearful, moody;
- Going pale.

Treating a hypo

- Get the patient to stop what they are doing – ignoring a hypo means it will only get worse;
- If there is time, do a test just to make sure; if not, get them to eat first and test later;
- Make sure they eat or drink something sugary, such as glucose tablets, or 150 – 200mls orange juice; or 90 – 120 mls lucozade; or 3 heaped teaspoons of sugar dissolved in water. This quick-acting carbohydrate will raise their blood glucose levels quickly;
- The amount needed will vary from person to person;
- Don't use chocolate – because of its fat content, it doesn't work quickly enough;
- Try to sit them down until they feel better;
- After about 10 minutes, check their blood glucose again;
- Many people will need a longer-acting carbohydrate, e.g. fruit, biscuit, small sandwich or their next meal (if it's due). This will prevent their blood glucose levels from dropping again. Again, the amount needed will vary.

## 12. Treatment of Hyperglycaemia

Hyperglycemia (hyper) is when blood glucose levels are above 10 mmols/l.

Signs and symptoms:

- Thirst;
- Passing urine more frequently;
- Loss of appetite;
- Weight loss;
- Blurred vision;
- Genital itching due to thrush.

If patient has any of the following symptoms, test for ketones in the urine:

- Nausea and / or vomiting;
- Abdominal pain;
- Drowsiness;
- Confusion;
- Laboured breathing.

If a ketones trace is present in the urine, the patient's General Practitioner should be contacted immediately.

If high levels of ketones are present in the urine, the patient should be sent **IMMEDIATELY** to Accident and Emergency. **These symptoms must be treated as an emergency.**

Contact GP if:

- A pattern of raised blood glucose results becomes apparent;
- Raised blood glucose levels are persistent;
- The patient's general condition is deteriorating.

Appendix 1 – Lifescan blood glucose monitors competency statement – Annual assessment

**LifeScan Blood Glucose Monitors Competency Statement**  
**Annual Assessment**



Title (Mr/Mrs/ Miss/ Dr etc):
Forename(s):
Surname:
Job Title:
Location/Dept/Ward:

**Competency Assessed on the following LifeScan Blood Glucose Meters**



You must show the assessor that you can complete all the below tasks to be considered competent. The use of the blood glucose monitor remains with the user, if you do not feel competent you should seek education on the device. The assessment must be passed and verified by an authorised LifeScan trainer.

HCP must be able to competently demonstrate / explain the following	Pass	Retrain
1: Set up new meter for use 2: Complete a control solution test and know how to record results 3: Explain the importance of washing hands prior to testing	<input type="checkbox"/>	<input type="checkbox"/>
4: Insert test strip correctly 5: Set up lancing device and select correct sample site 6: Apply blood sample to test strip 7: Understand and explain the blood glucose result	<input type="checkbox"/>	<input type="checkbox"/>
8: If EQAS system is used, explain the monthly sample procedure 9: Who to contact if the meter is faulty 10: How to clean the meter 11: Proficient to train and assess others on LifeScan Blood Glucose Monitors	<input type="checkbox"/>	<input type="checkbox"/>

I have passed the assessment, I am aware of my responsibilities and I am accountable for my own actions when performing a blood glucose monitoring test on a patient.

Signature:	Date:
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Competence Verified by:	Date:
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Appendix 2 - Interim blood glucose monitoring certificate



Cheshire and Wirral Partnership **NHS**  
NHS Foundation Trust

**This certifies that**

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**has undergone training for use of  
Lifescan One Touch VERIO PRO + blood glucose meter**



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**CWP West Physical Health Services**



#### Appendix 4 - Meter history logbook / meter change form

If there is a change of meter user, it is essential to fill out this form and fax to

Q Point: 01276 21547

Team name	
Team base	
Meter serial number	
Name of previous registered user	
Name of current user	
<b>Signature</b>	
<b>Print name</b>	