BLOOD GLUCOSE MONITORING FOR PATIENTS OTHER THAN THOSE WITH DIABETES MELLITUS GUIDELINE	
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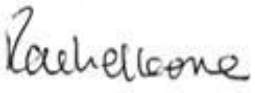
Authorised By *Name: Rachel Kenna* *Title: Director of Nursing*	*Signature:* *Date: February 2017* 
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1.0 Introduction

Blood glucose monitoring is a procedure frequently carried out by staff to determine an infant or child's blood glucose level. A normal blood glucose level is 3.5-6.9 m/mols approximately.

A portable glucose monitor is used in the department or a blood sample is sent to the laboratory for further analysis.

Ketones are a waste product in the breakdown of fats in some situations a blood ketone level may be requested Staff are educated in the theory and practical use of the blood glucose monitors in OLCHC, the management of calibration and quality control is included in this guideline.

The Precision Xceed Pro is used on all the ward areas. The rationale for its use is based on its capability to monitor Blood Ketone levels and its ability to self-calibrate. See fig 1 below. The Optium Xceed is used in St Michaels ward only. This is a single patient use unit which is supplied to each individual patient when diagnosed with Diabetes Mellitus.

2.0 Indications for blood glucose monitoring

Infants < 1year prior to surgery on nil orally
Infants/Children receiving intravenous/Subcutaneous Insulin
Infants/Children receiving Intravenous glucose of 10% or higher.
Infants/Children receiving Intravenous fluids for longer than 12 hours on nil orally
Infants/Children following surgery as part of the post-operative procedure
Known Infants/Children with Diabetes Mellitus and or some metabolic or Glycogen storage disorders
Infants/Children receiving specific medications e.g. Orecotide, Methylprednisilone, Diazoxide
Any alteration in the child's neurological status.
All critically ill children.
Children receiving Total Parental Nutrition (TPN).
Children with seizures.
Clinical signs of dehydration.
History of hypoglycaemia.
Prolonged fasting (Dependent on patient age, weight, past medical history and whether on IV fluid replacement)

History of Insulin Dependent Diabetes Mellitus.

3.0 Equipment

Gloves.
Cotton wool / Band-Aid.
Calibrated Blood Glucose Monitor
Blood Glucose Test Strips
Single use sterile lancet
Sharps Bin.

4.0 Suggested fasting times

Age	Solid food	Fluid	Clear fluid	No glucose fasting
< 6 months	6 hours	4	2 hours	6 hours
8-12 months	6 hours	4	2 hours	12 hours
1-2 years	6 hours	6	2 hours	12 hours
2-7 years	6 hours	6	2 hours	12 hours
> 7 years	6 hours	6	2 hours	12 hours

Society of Paediatric Anaesthesia 2012

ACTION	RATIONALE & REFERENCE
Prior to the procedure ensure the monitor is checked for the following: 1. The test strips are in date. 2. That the monitor & test strips have been calibrated together as per manufacturer's instructions. 3. That if a new pack of strips is required, the monitor is re calibrated. **Xceed Pro** is calibrated on a daily basis. This unit will not function unless the steps for calibration are followed with High and Low solutions. **Optium Xceed** is calibrated each time a new box of glucose/ketone test strips are opened or	To ensure accuracy of the result (Abbott Laboratories Ireland (2011).  

2 weekly. Check that the strips are unopened. Check that the glucose /ketone strips are in date. Check that glucose /ketone strips are stored at 4° - 30° & are kept out of direct sunlight.	To reduce child /parent anxiety & incorporate family centred care in the procedure (Trigg & Mohammed, 2010)
Prepare the Accu-check device for use as shown as per manufacturers instructions. Explain the procedure to the child & parents /carers, taking care to ensure the reason for the blood glucose monitoring is detailed The physical & psychological preparation depends on the child's age, interests & previous experience.	The patient should be aware of the procedure in order to alleviate anxieties and to be able to co-operate with the procedure (Dougherty & Lister 2015).
Involve parents in the procedure. Use distraction techniques (if applicable) to reduce anxiety.	Encourage child involvement where possible.
Encourage the child to either sit or lie in a position that is comfortable for them. Some children may not want to see the procedure being carried out.	
Wash hands, put on gloves & provide a clean environment prior to doing the test. Use ANTT level 2.	To prevent infection & contamination (Sari, 2009, OLCHC 2010a, Rowley 2011)
Patients who learn to do their own blood sampling should be advised to wash their hands in warm water prior to blood sampling.	To ensure hands are clean prior to the procedure and to increase blood supply to the area (Trigg & Mohammed, 2010, OLCHC 2010a)
The fingertip should be completely dry. The use of alcohol rub should be avoided	To ensure a non-contaminated result. Alcohol swabs may alter readings (Dougherty & Lister 2015)(Abbott, 2010)
Encourage patients to keep their hands warm until sampling has been performed.	To encourage good blood flow (OLCHC 2010).
	To ensure the patient's safety as some patients may

Ask the patient to sit or lie down	feel faint when blood is taken.
Use a single patient use lancet	To ensure accurate results. (Abbott Laboratories Ireland 2010).
Open the strip packet by tearing at the notch in the foil.	To ensure a good blood supply.
Prepare the blood glucose monitor as per manual.	To minimize the risk of cross infection. Sari, 2009, OLCHC 2010
Ensure the lot number on the machine matches the lot number on the strip foil packet.	
A lancet device should always be used as it has a measured depth. The depth used is variable depending on what angle the lancet is placed on the skin and the patient age and site chosen.	To ensure accurate results (Abbott 2010)
Prick the side of the finger using the single use lancet. If necessary, blood can be collected in a capillary tube coated with heparin or EDTA, and then be applied to the test strip within 30 minutes of collection. To avoid Unnecessary finger pricking	The side of the finger is used, as it is less painful and easier to obtain a 'hanging' droplet of blood.
Ensure the site of piercing is rotated.	The site is rotated to reduce the risk of infection from multiple stabbing, the areas becoming toughened. It is also rotated to reduce pain.
Avoid frequent use of the index finger and thumb. (The heel may be used in infants). Please ensure the rotated site is documented in the nursing care plans.	NMBI 2016)
The finger may bleed without assistance or might need assistance by 'milking'. If this is the case gently milk the finger until a drop of blood is available. Avoid extreme squeezing of the puncture sites.	To stop bleeding /prevent blood contamination
If blood is to be taken from a venous/arterial line, remove blood as per hospital policy.	As per Biochemistry Laboratory OLCHC.
Apply the blood to the target area (test strip) on the glucose /ketone strip. Apply at least 3.5ul to the test area.	Follow guidelines given by specific manuals to ensure results are correct (Abbott 2010).
If insufficient blood is available, apply a second drop within 30 seconds. If the second drop is not available within 30 seconds, recommence with a new strip.	To stem the flow of blood
Apply gentle pressure to puncture site with the use of gauze or a Band-Aid.	To reduce the risk of needle stick injury To ensure the accuracy of the result.

Depending on the type of monitor used, the method used for reading results will differ. Dispose of the lancet in the sharps box. Ensure safe disposal of the gloves, cotton wool etc… Once the result is obtained, record immediately. Dispose of waste appropriately. Remove gloves and dispose. Make the patient comfortable and observe the site of test for bleeding. Wash hands. Document in the infant/child's notes the effectiveness of therapy, together with any side effects or problems encountered.	To reduce the risk of cross infection. To ensure the patients comfort. To prevent cross infection, OLCHC, 2011. Maintains accountability through accurate recording of nursing intervention NMBI (2016)

5.0 Normal Blood Glucose Ranges

Child without Diabetes.	3.5 – 6.9 mmols/litre (Fasting- American Diabetes Association 2003
Insulin Dependent Diabetic < 1 year	5 – 9.5 mmols/litre (Accepted target level)
Insulin Dependent Diabetic > 1 year	4-8.5mmols / litre (Accepted target level)

NOTE:

If Blood sugar is < 3mmols / litre, please follow Hypoglycaemia guidelines available on the hospital intranet.

If Blood sugar is elevated with ketones present, contact endocrine team for further guidance and follow guidelines for management of children with Diabetes Mellitus (Murphy et al 2004)

6.0 References

A Bord Altranais. 2007 *Guidance to Nurse's and Midwives on Medication Management.* An Bord Altrainis. Dublin.

Aylott M. & Battrick C. *Developing Practical Skills for Nursing Children and Young People*. Hodder, Arnold Publishers Ltd., London, p203- 219.

Costigan, C; Thornton, p; Kennt, D. (1998) Hypoglycaemia. Diabetes and Endocrinology Centre and department of clinical Biochemistry, OLHSC.

Cowan, T. (1997) Blood glucose monitoring devices. *Professional Nurse*, 12(8):593-597.

North Glasgow University Hospitals NHS division Clinical Procedure Manual

Dougherty, L. & Lister, S (2015) (eds) Chapter 25: *The Royal Marsden Hospital Manual of Clinical Nursing Procedures. 9th Edition.* Wiley-Blackwell Publishing. Oxford. ISBN: 978-1-118-74591-2.

Health Service Executive, (2009) Health Protection Surveillance Centre (HPSC) *Strategy for the Control of Antimicrobial Resistance in Ireland;* Guidelines for the antimicrobial stewardship in Hospitals in *Ireland*, HSE Dublin Ireland.

Health Service Executive, (2009) *Infection Control ELearning Module* http://www.hseland.ie/

HSE, National Hospitals Office, (2012) *Code of Practice for Healthcare Records Management,* Version 3 (2012), Health Service Executive, Dublin Ireland.

Mohammed TA (2010) *Practices in Children's Nursing: Guidelines for Community and Hospital*. 3rd edn, Churchill Livingstone, Edinburgh

Murphy N., Costigan C. & Owens C. (2016) *Guidelines for the Management of Children with Diabetes Mellitus.* OLHSC. Dublin

Nursing and Midwifery Board of Ireland (2015a). *Recording Clinical Practice. Guidance to Nurses and Midwives*.2nd edition NMBI. Dublin.

Nursing and Midwifery Board of Ireland (2015b) *Scope of Nursing and Midwifery Practice Framework,* 2nd edition, NMBI, Dublin.

Nursing and Midwifery Board of Ireland, (2016) *Medication Management for Nurses and Midwives,* NMBI, Dublin.

Our Lady's Children's Hospital (OLCHC) (2013) *Guideline for Hand Hygiene*, OLCHC, Dublin

Our Lady's Children's Hospital (OLCHC) (2010) *Waste Management Policy.* OLCHC, Dublin

Our Lady's Children's Hospital (OLCHC) (2016a) *Guidelines for the Management of Children with Diabetic Ketoacidosis,* OLCHC, Dublin Ireland.

Our Lady's Children's Hospital (OLCHC) (2016b) *The Hospital Formulary and Prescribing Guide,* OLCHC, Dublin.

Our Lady's Children's Hospital Crumlin, (2011) *Standard Universal Precautions*, OLCHC, Dublin, Ireland.

Our Lady's Children's Hospital for Sick Children (OLCHC) (2009a) *Guidelines on the Care of the Child Requiring Clinical Holding*, OLCHC, Dublin.

Our Lady's Children's Hospital (2012) *Guideline on the use and decontamination of the Blood Glucose Monitor,* OLCHC, Dublin.

Rowley, S. and Clare S. (2011) *Aseptic Non Touch Technique (ANTT): Reducing Healthcare Associated Infections (HCAI) by standardising Aseptic Technique with ANTT across large clinical workforces.* American Journal of Infection control. 39 (5), p. E90.

Smith et al, 1991. *Comprehensive Child and Family Nursing Skills.* Mosby Year Book. St Louis Missouri, U.S.A.

Trigg E and Mohammed TA (2010) *Practices in Children's Nursing: Guidelines for Community and Hospital*. 3rd edn, Churchill Livingstone, Edinburgh

Wong, D.L. (2006) Wong's Nursing Care of Infants and Children. Mosby. London

Appendix 1

ALGORITHM ON THE CLEANING AND QUALITY CONTROL CHECKS OF THE BLOOD GLUCOSE/KETONE MONITOR

Cleaning and QC checks

- The Blood glucose/ketone monitor will be cleaned and decontaminated at the commencement of the day shift each day.
- Quality control (Quality Control) checks will be performed and recorded as per manufacturer's instructions.
- Each department must keep a record of their daily cleaning and QC checks which is audited on a quarterly basis.
- The nurse in charge must be informed of any concerns that arise out of the checks.

- An assurance tag will be placed on the glucometer box following cleaning
- This assurance tag will be dated, signed and timed by the healthcare worker who cleaned the device.
- The glucometer must be stored clean and ready for use.
- A glucometer tray/box used for multiple children must not be brought to the patient's bedside. Use a disposable tray to bring only the required equipment
- Used items **must not** be returned to the glucometer box.
- **The staff member who used the monitor must decontaminate it in accordance with OLCHC Guideline along with a new assurance tag.**

If there is no tag

STOP

THE MONITOR MUST BE CLEANED FIRST.