



Guideline on the Choice of Glucometers and Ketometers for children and young people with TYPE 1 DIABETES (April 2021)

Introduction

This guideline aims to assist healthcare professionals (HCPs) in secondary and primary care (if applicable) with the selection of glucometers* and ketometers* for children and young people with TYPE 1 DIABETES, to enable self-monitoring of their blood glucose and blood ketone levels.

NICE guideline (NG18) advises the following in relation to the frequency of blood glucose testing for children and young people with type 1 diabetes:

- To routinely perform at least 5 capillary blood glucose tests per day.
- More frequent testing is often needed (for example with physical activity and during intercurrent illness). Children and young people should be prescribed enough test strips for this.

(*referred to as meters throughout this guideline, as appropriate)

NICE guideline (NG18) also states that children and young people with type 1 diabetes should be offered blood ketone testing strips and a meter, and patients and their family members or carers (as appropriate) should be advised to test for ketonaemia if they are ill or have hyperglycaemia.

NICE recommends that each child and young person with type 1 diabetes and their family members or carers (as appropriate) should be provided with clear individualised oral and written advice ('sick-day rules') about managing type 1 diabetes during intercurrent illness or episodes of hyperglycaemia, including, monitoring and interpreting blood ketones.

Background

Self-monitoring of blood glucose is an essential part of the management of type 1 diabetes. Previously in N.Ireland the majority of patients were prescribed glucose test strips which were >£10 for a pack size 50. The prescribing of cost effective glucose test strips has increased in the recent years, following implementation of HSCB Guideline on the choice of blood glucose strips for adults with type 2 Diabetes first issued in September 2017. Health and Social Care Trusts in Northern Ireland stock meters that are on the Regional Blood Glucose Meter List (approved by the NI Regional Pathology Network, Point of Care Testing Speciality Forum, March 2021).

Currently, primary care may stock meters which are not listed on the Trusts' Regional Blood Glucose Meter List (providing the meters are ISO15197:2015 compliant). Trusts' Regional Blood Glucose Meter List was used as a starting point for this guideline. Meters were identified from this list whose ketone blood strips were <£10 for pack size 10 and/or blood glucose strips cost <£10 for pack of 50. Any glucometers added to the Trusts' Regional Blood Glucose Meter List following publication of the HSC guideline may also be distributed, providing the glucose test strips are <£10 for 50 and/or the blood ketone test strips are < £10 for 10.

ALL meters in this guideline meet the following requirements:

- ISO 15197:2015 approved and will be provided free of charge from GP surgeries and diabetes clinics
- Free support material supplied and free control solution provided
- Unable to delete glucometer readings
- Measurement range between 1.1 to 33.3mmol/l or more and measures only in mmol/l
- No calibration or coding is required to set up (NB: some of the dual blood glucose and blood ketone meters will require some simple coding)
- A starter meter pack is available that includes blood glucose strips and lancets.

Choice of meter

ALL children and young people with Type 1 diabetes are required, on occasion to test their blood ketone levels and so ALL children and young people with Type 1 diabetes should be supplied with a ketometer to enable blood ketone testing.

Clinicians should ensure children and young people (and their family members or carers) clearly understand when to test for blood ketones and how to interpret results.

In the vast majority of cases, children and young people with type 1 diabetes will be supplied with a meters from secondary care.

Whilst it is acknowledged that, when choosing a meter, consideration of patient preference and their individual needs is paramount, it is expected that the meters listed below will suit the individual needs of the majority of children and young people with Type 1 diabetes.

Cost-effective meters which test for blood glucose and blood ketones

Appendix A lists 5 cost effective combined glucose/ketone meters choices which should be supplied to children and young people with type 1 diabetes to monitor their blood ketones and if the meter meets their clinical requirements, it could also be used to monitor their blood glucose.

Cost-effective meters for testing blood glucose

Appendix B lists 23 glucometers which use cost effective blood glucose strips and could be supplied to children and young people if the combined meter in appendix A does not meet their blood glucose testing requirements.

This includes a voice glucometer option suitable for visually impaired.

NOTE: These children and young people will still require a ketometer for testing blood ketones, and so should also be provided with an option from Appendix A to test their blood ketones.

ALL meters listed in appendix A and B use cost effective glucose strips and ketone strips, therefore where possible these should be used as first line choices for children and young people with type 1 diabetes.

Other scenarios

Carbohydrate counting/ Calculation of insulin dose

Some children and young people with type 1 diabetes, use an insulin calculator to work out their required insulin dose, based on carbohydrate/insulin ratio.

There are 2 options available:

- (1) **Apps** (can be used in conjunction with cost effective meters)
- (2) **'Smart Glucometer'** (if use of apps with a cost effective meter not suitable)

Supply with a 'Smart' glucometer from appendix C **(PLEASE NOTE THIS METER WILL BE PHASED OUT FROM JUNE 2021)**

NOTE:

- The 'Smart' glucometer, Accu-chek Expert[®] **does NOT use cost effective test strips** and so should only be issued to children and young people with type 1 diabetes who need to use an insulin calculator to work out their required insulin dose, based on carbohydrate/insulin ratio and the use of apps is not possible or the 'smart' glucometer is preferred by the patient (or their family members/carers).
- These children and young people will still require a ketometer for testing blood ketones, and so should also be provided with an option from Appendix A to test their blood ketones.
- If a patient has been assessed as requiring to use a 'Smart' glucometer it should be clearly documented in the patient's notes that the patient uses their glucometer as an insulin calculator to work out their required insulin dose, based on carbohydrate/insulin ratio. These patients should not be changed to an alternative glucometer, unless in consultation with the patient's diabetes healthcare professional.

Insulin pumps

Meters used along with insulin pumps are supplied directly from the relevant company along with the pump system. These meters are not specifically listed in this guideline but should ONLY be supplied to those using insulin pumps, as generally they do not use cost effective test strips.

NOTE:

- These children and young people will also require a ketometer for testing blood ketones, and so should also be provided with an option from Appendix A to test their blood ketones.
- For patients who use insulin pumps, it should be clearly documented in the patient's notes that their glucometer should not be changed unless in consultation with the patient's diabetes healthcare specialist.

Use of FreeStyle Libre®

Many children and young people now use the Freestyle Libre® flash monitoring device to monitor their glucose levels.

These children and young people will still on occasions be required to test their blood glucose levels by finger pricking. See link below to Freestyle Libre® pathway, for details on prescribing and guidance on suitable meters to use alongside the Freestyle Libre® system.

http://www.hscboard.hscni.net/download/PUBLICATIONS/pharmacy_and_medicines_management/correspondence/Pathway-for-the-Managed-Access-of-FreeStyle-Libre.docx

The FreeStyle Libre® reader device has a bolus calculator functionality to enable calculation of insulin doses, based on carbohydrate/insulin ratio. This function requires to be activated by a healthcare professional. Children and young people who use the FreeStyle Libre® system and require to use an insulin calculator, should where possible be supplied with a meter from appendices A or B and use it in conjunction with a suitable App, to enable calculation of insulin doses. This option is favourable, as it enables use of cost effective test strips.

Storage and ordering of meters

- HCPs must no longer accept free or issue glucometer/ketometer samples from pharmaceutical companies, which are not on listed in this HSC guideline (Appendices A to C).
- Meters not listed in this guideline should either be returned to the relevant manufacturer or safely disposed of.

Note: Insulin pumps will require a compatible meter, most often supplied directly from the pharmaceutical company. These meters are not specifically listed in this guideline but should ONLY be supplied to those using insulin pumps.

Supply of meters

- In **exceptional circumstances**, a child or young person with type 1 diabetes may require a meter which is not listed in the HSC guideline. The reason should be clearly documented in their clinical records.
- Children and young people with type 1 diabetes should be provided initially with two meters (one spare). Patients should be counselled that the second meter should only be used, as a spare. Patients should NOT use two different meters at the same time, so that accurate and meaningful results can be obtained. NB: Adequate access to measuring glucose in a school setting should be described in the patient's annual health plan (in some cases this may require a second glucometer in school).

Information for patients

- Patients should be provided with a patient information leaflet (Appendix D) when they receive a new meter. They should be encouraged to take ownership for the management and maintenance of their meters from the outset. They should register their meter with the relevant pharmaceutical company.
- Patients should be advised to follow the recommended quality control test for their specific meter.
- If patients have any problems or require a new meter/battery/control solution, they should be advised to contact the relevant pharmaceutical company directly.
- **Patients should be discouraged from changing their meters frequently and advised NOT to change their meter without first consulting their diabetes healthcare professional. The prescribing of strips and lancets for patients with type 1 diabetes who purchase or obtain a meter which is NOT on the HSC list and/or was not specifically recommended by their diabetes healthcare professional, is not supported by HSC, and may require the patient to pay for these themselves. The exception is meters which are used with insulin pumps.**

Communication to other health care professionals

- It is good practice for all healthcare professionals to document in the patient's clinical notes details of the meter(s) which a patient is currently using.
- Correspondence from HSC Trusts to GPs should clearly state the specific brand of blood glucose, blood ketone test strips and lancets required and an appropriate quantity to be prescribed.

Switching meters

- Trusts should actively switch children and young people with type 1 diabetes, who are currently not using a cost effective meter to one of the meters on HSC list using this guideline, as appropriate.
- All changes should be documented in the patient's notes.
- **Switching should NOT take place in primary care.**

Information for GPs and Community Pharmacists

- GPs should prescribe the particular brand of blood glucose test strips, blood ketone test strips and lancets as specified by secondary care communication. If requests for non-cost effective blood glucose and ketone strips are not accompanied by secondary care communication, these should be queried by the GP practice.
- Lancing devices are not listed on the N.Ireland Drug tariff and so therefore cannot be prescribed. They are included in meter starter packs, so all patients will be supplied with a lancing device when they are given a new meter.
- Replacement lancing devices can be requested from the manufacturer.
- Community pharmacists should retain the list of meters on the HSC guidance for use by their staff. Community Pharmacists should be aware that GPs may not issue prescriptions for glucose strips, ketone strips and lancets for meters which are not on the HSC list. The exception is meters which are used with insulin pumps.

In general, community pharmacists should advise patients not to change their meter, without first consulting their diabetes healthcare team. If a patient presents to a pharmacy at the weekend, or during out of hours (when a patient's diabetes healthcare professional is not available) and urgently requires a new meter, the community pharmacist should, where possible, supply the patient with a meter, from appendix A or B (providing it meets their clinical testing requirements).

Revision of the guideline

Meters which are added to the Trusts' Regional Blood Glucose Meter List, following publication of this guideline may also be distributed to suitable patients (as outlined above), providing the glucose test strips are cost effective (<£10 for 50) and/or blood ketone strips are cost effective (<£10 for 10). This also includes any meters on the regional list, whose corresponding glucose test strips and/or ketone strips reduce in price, following publication of this guideline.

This guideline will be updated in April 2024.

Appendix A: Cost effective choice meters which test for both blood glucose and blood ketones
(Prices correct as per April 2021 Drug Tariff)

Meter	Name of test strips and	Price of test strips (50 pack Glucose; 10 pack ketones)	Contact for ordering meters	Link to manufacturer website for meter specifications
4Sure Smart Duo meter (Nipro Diagnostics)	4SURE test strips 4SURE B-Ketone test strips	£8.99 Glucose £9.92 Ketone	Sales Support Tel: 0800 0858808 Email: sales.support@nipro-group.com Irene Jacobs (Territory Sales Manager) Tel: 07799891638 Email: irene.jacobs@nipro-group.com	https://www.nipro-diagnostics.co.uk/professionals https://www.nipro-diagnostics.co.uk/patients
Caresens Dual (Spirit Healthcare)	CareSens PRO Glucose strips KetoSens Blood β -Ketone Test Strips	£9.95 Glucose £9.95 Ketone	Lucy Beazley Tel:079845259 Email: Lucy.Beazley@spirit-healthcare.co.uk Or through Customer Services team on 0800 881 5423 Email: cs@spirit-healthcare.co.uk	https://www.spirit-health.co.uk/spirit-healthcare-old/products-for-diabetics/blood-glucose-meters
Glucomen Areo 2K (Medicon Ireland)	Glucomen Areo sensors Glucomen Areo B-Ketone Sensors	£8.25 Glucose £9.95 Ketone	Jim McGrory Tel: 07771863108 or 028 30835500 Email: jimmcg@mediconire.com OR info@mediconire.com	https://www.mediconire.com/how-to-use-video

Meter	Name of test strips and	Price of test strips 50 pack Glucose 10 pack ketones	Contact for ordering meters	Link to manufacturer website for meter specifications
Glucorx HCT meter (Glucorx)	Glucorx HCT Glucose Glucorx HCT Ketone	£8.95 Glucose £9.95 Ketone	Sean O'Reilly Tel: 07392198501 Email: sean@glucorx.co.uk Or orders@glucorx.co.uk	https://www.glucorx.co.uk/hct-instructions/ https://www.glucorx.co.uk/hct-instructions/
Glucorx HCT Connect (Glucorx)				https://www.glucorx.co.uk/our-products/glucorx-hct-connect/ https://www.glucorx.co.uk/connect-i-glucose-meter/

Appendix B: Blood glucose meters with corresponding test strips <£10 (prices correct as per April 2021 NI Drug tariff)

Meter	Name of test strips and	Price of test strips (50 pack)	Contact for ordering meters	Link to manufacturer website for meter specifications
4Sure Smart Meter (Nipro Diagnostics)	4SURE	£8.99	Sales Support Tel: 0800 0858808 Email: sales.support@nipro-group.com Irene Jacobs (Territory Sales Manager) Tel: 07799 891638 Email: irene.jacobs@nipro-group.com	https://www.nipro-diagnostics.co.uk/professionals https://www.nipro-diagnostics.co.uk/patients
Accucheck Instant (Roche)	Instant	£7.50	Ann Sloan Diabetes Care Specialist (ann.sloan@roche.com) T: 07513480840	https://www.rochediabetes.com/en-gb/resources/product-information
Accucheck Mobile (Roche)	Mobile test cassette	£9.99	Office Team: 0800 0407221 Office Email: Burgesshill.dcaccountmanagers@roche.com	https://www.accu-chek.co.uk/meters
Accucheck Performa Nano (Roche)	Performa	£7.50		
Contour Plus Blue (Ascensia)	Contour Plus strips	£8.50	Emma Boyd Tel: 07469402761 Email: emma.boyd@ascensia.com	https://www.diabetes.ascensia.co.uk/products/portfolio-overview/

Meter	Name of test strips	Price of test strips (50 pack)	Contact for ordering meters	Link to manufacturer website for meter specifications
Contour (Ascensia)	Contour Strips	£9.99	Emma Boyd Tel: 07469402761 Email:	https://www.diabetes.ascensia.co.uk/products/portfolio-overview/
Contour Plus (Ascensia)	Contour Plus Strips	£8.50	emma.boyd@ascensia.com	
Glucomen Areo (Medicon Ireland)	Glucomen Areo	£8.25	Jim McGrory Tel:07771863108 02830835500 Email: jimmcg@mediconire.com OR info@mediconire.com	https://www.mediconire.com/how-to-use-video
GlucorX Nexus (GlucorX)	GlucorX Nexus	£8.95	Sean O'Reilly Tel: 07392198501 Email:	https://www.glucorx.co.uk/our-products/nexus-meter/ https://www.glucorx.co.uk/our-products/glucorx-nexus-mini-ultra-meter/ Home Blood Glucose Monitor GlucorX https://www.glucorx.co.uk/our-products/nexus-voice-meter/ https://www.glucorx.co.uk/manuals-and-videos/ https://www.glucorx.co.uk/our-products/glucorx-q-blood-glucose-monitoring-system/ Q Instructions GlucorX
GlucorX Nexus Mini Ultra (GlucorX)	GlucorX Nexus	£8.95	Or orders@glucorx.co.uk	
GlucorX Nexus Pearl	GlucorX Nexus	£8.95		
GlucorX Nexus Voice (GlucorX)	GlucorX Nexus	£8.95		
GlucorX Q (GlucorX)	GlucorX Q	£5.45		

Meter	Name of test strips	Price of test strips (50 pack)	Contact for ordering meters	Link to manufacturer website for meter specifications
Mylife Aveo (Ypsomed Ltd)	Mylife Aveo	£6.95	Halen Campbell Tel: +44 7572702536 halen.campbell@ypsomed.com	https://www.mylife-diabetescare.com/en-GB/products/blood-glucose-monitoring-systems/mylife-aveo.html
Mylife Unio Cara (Ypsomed Ltd)	Mylife Unio	£9.50	Or 0344 856 7820 info@ypsomed.co.uk	https://www.mylife-diabetescare.com/en-GB/products/blood-glucose-monitoring-systems/mylife-unio-cara.html
Mylife Unio Neva (Ypsomed Ltd)	Mylife Unio	£9.50		https://www.mylife-diabetescare.com/en-GB/products/blood-glucose-monitoring-systems/mylife-unio-neva.html
One Touch Select Plus (Lifescan)	One Touch Select Plus	£9.99	Deborah Stewart Tel: 07920 084318 Email: Dstewa33@lifescan.com Customer Care:0800 121 200	www.myonetouch.co.uk
TEE2+ (Spirit Healthcare)	TEE2 Strips	£7.75	Lucy Beazley Tel: 07984 525259 Email: Lucy.Beazley@spirit-healthcare.co.uk Customer Services team: 0800 881 5423 Email: cs@spirit-healthcare.co.uk	https://www.spirit-health.co.uk/spirit-healthcare-old/products-for-diabetics/blood-glucose-meters

Meter	Name of test strips a	Price of test strips	Contact for ordering meters	Link to manufacturer website for meter specifications
TRUE Metrix AIR (Trividia Health)	True Metrix	£6.95	Jon Lowther Regional Sales Manager – EMEA Tel: 07767677667 Email: jlowther@trividiahealth.co.uk	https://professionals.trividiahealth.co.uk/home/blood-glucose-monitoring/true-metrix-air/
TRUE Metrix GO (Trividia Health)	True Metrix	£6.95		
Vivacheck Ino (JR Biomedical Ltd)	Vivacheck Ino	£8.99	Direct from company. Freephone 0800 612 7531 or from Catherine Rees (Based in North Wales) Tel: 01745 535169/535207 Email: catherine.rees@jrbiomedical.com	http://www.vivachekdiabetes.co.uk/
Wavesense JAZZ™ (Agamatrix)	WaveSense JAZZ	£8.74	Yes, order direct from Julian Mulligan Diabetes Care Manager Tel: 07798 942290 Email jmulligan@agamatrix.com Customer Care: 0800 093 1812	https://agamatrix.co.uk/products/
Wavesense JAZZ™ Wireless (AgaMatrix)	WaveSense JAZZ	£8.74		

Appendix C: Smart Glucometer. NOTE: This NOT a cost effective choice and so should only be supplied to patients in accordance with the guidance above (Prices correct as per April 2021 NI Drug Tariff)
(DUE TO BE PHASED OUT JUNE 2021 subject to stock availability)

Meter	Name of test strips and	Price of test strips 50 pack	Contact for ordering meters	Link to manufacturer website for meter specifications
Accu-chek Expert (Roche) (SMART GLUCOMETER)	Aviva test strips <i>Please note:</i> Aviva test strips will continue to be available and there are currently no plans to discontinue these. The new Accu-Chek Instant system or the Accu-Chek Mobile system can be used alongside the mySugr app with its insulin calculator feature which is licensed for users over 18 years.	£16.21	DUE TO BE PHASED OUT JUNE 2021 subject to stock availability Ann Sloan Diabetes Care Specialist (ann.sloan@roche.com) T: 07513480840 Office Team: 0800 0407221 Office Email: Burgesshill.dcaccountmanagers@roche.com	https://www.rochediabetes.com/en-gb/resources/product-information https://www.accu-chek.co.uk/meters

Appendix D

{Insert relevant Trust
logo Department and
address}

Patient Information Leaflet (New Blood Glucose Meter)

Dear Patient,

Your diabetes team has recently supplied you with two blood glucose meters (glucometers). Your diabetes healthcare professional will have explained how and when to use your glucometer to test your blood sugars.

The Health and Social Care Board has provided diabetes healthcare professionals and GPs with a list of glucometers which are suitable to use for patients with type 1 diabetes. These glucometers have all been reviewed: they will provide you with accurate blood glucose results and are cost-effective.

We would encourage you to:

- As soon as possible, please register your new glucometer with the relevant pharmaceutical company. Their phone number is in the instruction booklet provided with your new glucometer. By registering your glucometer, the company will provide a replacement, if required. Some pharmaceutical companies also provide free replacement batteries.
- Only use one glucometer at a time. The second glucometer is a spare, only to be used if your original glucometer breaks.
- If your glucometer breaks, use your replacement glucometer and remember to contact the relevant company **as soon as possible** to get a new replacement glucometer.
- To follow the recommended quality control test for their specific glucometer.
- As your GP has been advised to ONLY prescribe test strips and lancets from the recommended list of glucometers, please **DO NOT** purchase or accept a free upgraded glucometer without first checking with your diabetes healthcare professional.
- **Using glucometers that are not on the list may require you to buy your own tests strips and lancets**

If you have any questions about the information in this letter or your glucometer, please contact *{insert name and contact details of relevant diabetes healthcare professional}*