Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

PAEDIATRICS

NATIONAL CLINICAL GUIDELINE

Annual review and co-morbidity screening in Paediatric Type 1 Diabetes

Clinical Design and Innovation
Health Service Executive

Version 1

Developed by:	National Clinical Programme for Paediatric Diabetes	Publication date:	October 2020
Document Reference Number:	NCD19-036-001	Revision Date:	October 2023

Clinical Design & Innovation
Person-centred, co-ordinated care

Table of Contents

1.0 Aim of Guideline

The aim of this guideline is to provide clear and standardised guidelines for all staff caring for paediatric patients with type 1 diabetes in order to detect co-morbidities (e.g. thyroid dysfunction, coeliac disease and dyslipidaemia) or complications and to improve their management.

2.0 Purpose and Scope

- The purpose of this guideline is to improve the management of paediatric patients with Type 1 diabetes
- These guidelines are intended for healthcare professionals, particularly those in training, who are working in HSE-funded paediatric and neonatal services.
- They are designed to guide clinical judgement but not replace it. In individual cases a healthcare professional may, after careful consideration, decide not to follow a guideline if it is deemed to be in the best interests of the child

3.0 Background and Introduction

Children with a diagnosis of diabetes require intervention, treatment and follow up care from a specialist paediatric team with expertise in managing their condition. Annual review provides an opportunity for the clinician along with the child or young person to review all aspects of their diabetes care including planning for transition to adult services pathway when age appropriate (16-18 years). A standardised approach should be employed to look for early signs of co-morbidities including coeliac disease, dyslipidaemia and thyroid dysfunction as well as complications.

4.0 Legislation/other related policies

Model of Care for All Children and Young People with Type 1 Diabetes
http://www.hse.ie/eng/about/Who/clinical/natclinprog/paediatricsandneonatology/paedsmoc.pdf

5.0 Glossary of Terms and Definitions

T1D	Type 1 Diabetes mellitus
IgA	Immunoglobulin A
Lipohypertrophy	Lump under the skin at the site of insulin injections that may result in abnormal insulin action
Lipoatrophy	Localised loss of fat tissue at the site of insulin injections
Microalbuminuria	Earliest sign of diabetic nephropathy. Present if urine albumin/creatinine ratio is between 30 and 300mg/g or 2.5mg-25mg/mmol in early morning urine sample
Nephropathy	Microvascular complication of the kidney. **Screen by:** • First morning urine samples for albumin/creatinine ratio (ACR) or • Timed urine collections for albumin excretion rates (AER). Due to the risk of biological variability at least 2 of 3 consecutive collections should be positive as evidence of microalbuminuria**.** If an abnormal result is found then this should be repeated as microalbuminuria may not be persistent. Screening should be avoided during periods of intensive exercise, menstrual bleeding, infections, pyrexia and marked hyperglycaemia as these may confound the results.

	Where patients have persistent microalbuminuria, angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs) should be considered (to prevent progression to proteinuria) in consultation with paediatric nephrology services. These drugs are potentially teratogenic and this needs to be carefully considered if prescribing to adolescent girls.
Retinopathy	Microvascular complication of T1DM Screening should begin at age 11 years (ISPAD) or 5 years post diagnosis of T1DM (if diagnosed before age 7 years) National diabetes retinopathy screening is available for all with T1DM in Ireland from age 12 years and screening is performed annually from age 12 years
Neuropathy	Microvascular complication of the nervous system. Screen by comprehensive foot exam checking sensation (vibration sense) and ankle jerks annually Autonomic neuropathy refers to damage to the nerves involved in involuntary body functions and can affect BP, HR, bowel, bladder and sexual function and should be considered if suggestive symptoms or signs.
Hypothyroidism (HT)	Autoimmune hypothyroidism (underactive thyroid) is more common in patients with T1DM. Screen for risk of HT by checking anti-TPO antibodies at diagnosis of T1DM.

	Screen for HT by measurement of thyroid function tests (TSH and FT4) at diagnosis and thereafter, every second year in asymptomatic individuals without goitre or in the absence of thyroid auto antibodies. Screen should be undertaken annually or more frequently if there are symptoms or signs of thyroid disease.
Coeliac disease (CD)	Occurs in 1.6-16 % of children with T1DM Screening should be performed at time of T1D diagnosis. The screening tests used should include tissue transglutaminase (tTG-A) and endomysial antibodies (EMA). IgA deficiency (more common in patients with CD and T1DM) should be excluded at diagnosis of diabetes, as screening for CD in cases of IgA deficiency will require IgG specific antibody tests (tTG IgG or EM IgG). As IgG antibody tests are less reliable, in this situation there should be a low threshold for referring for small bowel biopsy, especially in patients with symptoms. Screening for CD should then be carried out every 1-2 years or more frequently if there are clinical suspicions of CD or a first degree relative with CD. If a positive tTG-A is detected, EMA should be checked. For **symptomatic** children with tTG-A levels **> 10 times** the upper normal limit and positive EMA antibodies, small bowel biopsies are not essential

for confirmation of a diagnosis of coeliac disease. In this situation children should start a GF diet. Referral to GI services is advised if symptoms persist despite being on a GF diet

Asymptomatic children with **both** positive tTG-A screen (> 3 times ULN) and positive EMA, should be referred to GI services for small biopsy.

Asymptomatic children with positive tTG-A screen <3 times ULN should have repeat serology including EMA performed annually**.**

Children diagnosed with CD should receive education from a paediatric dietician. A gluten free diet should be commenced to help normalise the bowel mucosa to optimise growth, bone health, prevent anaemia and may also improve glycaemic control and reduce the risk of microalbuminuria. All first degree relatives should be advised to undergo screening for coeliac disease with their family doctor, even if asymptomatic. All children with coeliac disease should have annual tests to confirm normal haemoglobin, Vitamin D levels and thyroid function. Vit D deficiency can be associated with CD and consideration should be given to supplementation if D3 level suboptimal (< 50 nmol/L).

Hyperlipidaemia

Testing for dyslipidaemia should be performed when metabolically stable after diagnosis from age

11 years. If screen is normal, it should be repeated every 5 years.

Children with a family history of hypercholesteroalaemia or early cardiovascular disease should be tested earlier.

Testing ideally should be with fasting lipids but this may be impractical with diabetes. Testing can be undertaken with a random sample and if LDL or triglycerides are elevated, a fasting sample is then indicated

LDL > 2.6 mmol/L is elevated; first line management are interventions to improve metabolic control, dietary interventions and exercise promotion

If the above interventions do not reduce LDL cholesterol to < 3.4, statins should be considered in children from age 11 years after careful consideration and counselling on side effect profile

6.0 Roles and Responsibilities

This guideline should be reviewed by each acute hospital senior management team to appropriately plan implementation. This facilitates best practice and standardises the care provided to children in Ireland. This will ensure that the inpatient care of children/neonates admitted to their facility is optimised irrespective of location.

7.0 Clinical Guideline

7.1 At diagnosis of T1DM

It is recommended that all children newly diagnosed with T1DM should have screening for hypothyroidism, future risk of hypothyroidism, coeliac disease and IgA deficiency

TFTS

TPO antibodies

IGA , TTG and EMA

7.2 Annual Review aged < 11years with diabetes duration < 5 years

Physical Exam: should include measurement of height, weight, BP, injections sites, pubertal status (if relevant) and foot examination (sensation and ankle jerks**)**

Every 2 years*:

Testing for Thyroid Dysfunction: TFTs

Testing for Coeliac Disease: TTG (when IgA deficiency is out ruled)

7.3 Annual review aged < 11 years and diabetes > 5 years

Physical Exam: should include measurement of height, weight, BP, injections sites, pubertal status (if relevant) and foot examination (sensation and ankle jerks**)**

Retinopathy screening: Children aged <12 years with diabetes duration greater than 5 years, may be referred to local paediatric ophthalmology services for retinopathy screening.

Nephropathy screening: First morning urine samples for albumin/creatinine ratio (ACR) on two consecutive days

Every second year*:

Testing for Thyroid Dysfunction: TFTs

Testing for Coeliac Disease: TTG (when IgA deficiency out ruled)

7.4 Annual Review if aged ≥ 11 years

Physical Exam: should include measurement of height, weight, BP, injections sites, pubertal status (if relevant) and foot examination (sensation and ankle jerks**)**

Retinopathy screening: All children aged 12 years or older (ISPAD now recommend 11 years) should be referred for screening for retinopathy. From age 12 (see below) retinopathy screening will be undertaken by Diabetes Retinal Screening , the national screening programme (www.diabeticretinascreen.ie). Patients may be referred or may self-refer.

For further information see www.diabeticretinascreen.ie or free phone 1800454555

Microalbuminuria screening: First morning urine samples for albumin/creatinine ratio (ACR) on two consecutive days

Every 2 years:

Testing for Thyroid Dysfunction *: TFTs

Testing for Coeliac Disease *: TTG (when IgA deficiency is out-ruled)

Testing for Dyslipidaemia: Ideally fasting lipid profile; random sample is acceptable but if LDL > 2.6 or triglycerides are elevated, a fasting sample is indicated

*** unless symptomatic in which case screen when symptoms noted**

8.0 Implementation, Revision and Audit

- Implementation via CEO of each Hospital group and senior management team of each acute hospital
- Distribution to other interested parties and professional bodies
- The guideline development group has agreed that this guideline will be reviewed on a 3 yearly basis

- Regular audit of implementation and impact of this guideline through outcome and process measures is recommended to support continuous quality improvement. The audit process should be coordinated in each paediatric unit under local paediatric clinical governance and should be taken from a multidisciplinary perspective where appropriate

9.0 References

1. Al-Toma, A., Volta, U., Auricchio, R., Castillejo, G.,Sanders, D.S., Cellier, C., Mulder, C., Lundin,K.E.A. (2019). ***European Society for the Study of Coeliac Disease (ESsCD) guideline for coeliac disease and other gluten-related disorders.*** United European Gastroenterology Journal; Vol. 7(5) 583–613. DOI: 10.1177/2050640619844125

2. Husby, S., Koletzko,S.,Korponay-Szabo, I.R.,Mearin,M.L., Phillips, A., Shamir,R., Troncone, R., Giersiepen, K., Branski, D., Catassi, C., Lelgeman,M., Maki,M., Ribes-Koninckx, C., Ventura, A., Zimmer, K.P. (2012) ***European Society for Pediatric Gastroenterology, Hepatology, and Nutrition Guidelines for the Diagnosis of Coeliac Disease.*** JPGN Volume 54, Number 1,

3. Husby, S., Murray, J.A., Katzka, A. (2019) **AGA Clinical Practice Update on Diagnosis and Monitoring of Celiac Disease—Changing Utility of Serology and Histologic Measures: Expert Review.** Gastroenterology; 156:885–889

4. Husby, S., et al (2020) ***European Society Paediatric Gastroenterology, Hepatology and Nutrition Guidelines for Diagnosing Coeliac Disease 2020*** JPGN 2020; 70: 141–156 https://naspghan.org/wp-content/uploads/2020/01/January-2020-Article-B.pdf

5. International Society for Paediatric and Adolescent Diabetes (2014) ***ISPAD Clinical Practice Consensus Guidelines 201*** http://www.ispad.org/?page=ISPADClinicalPract

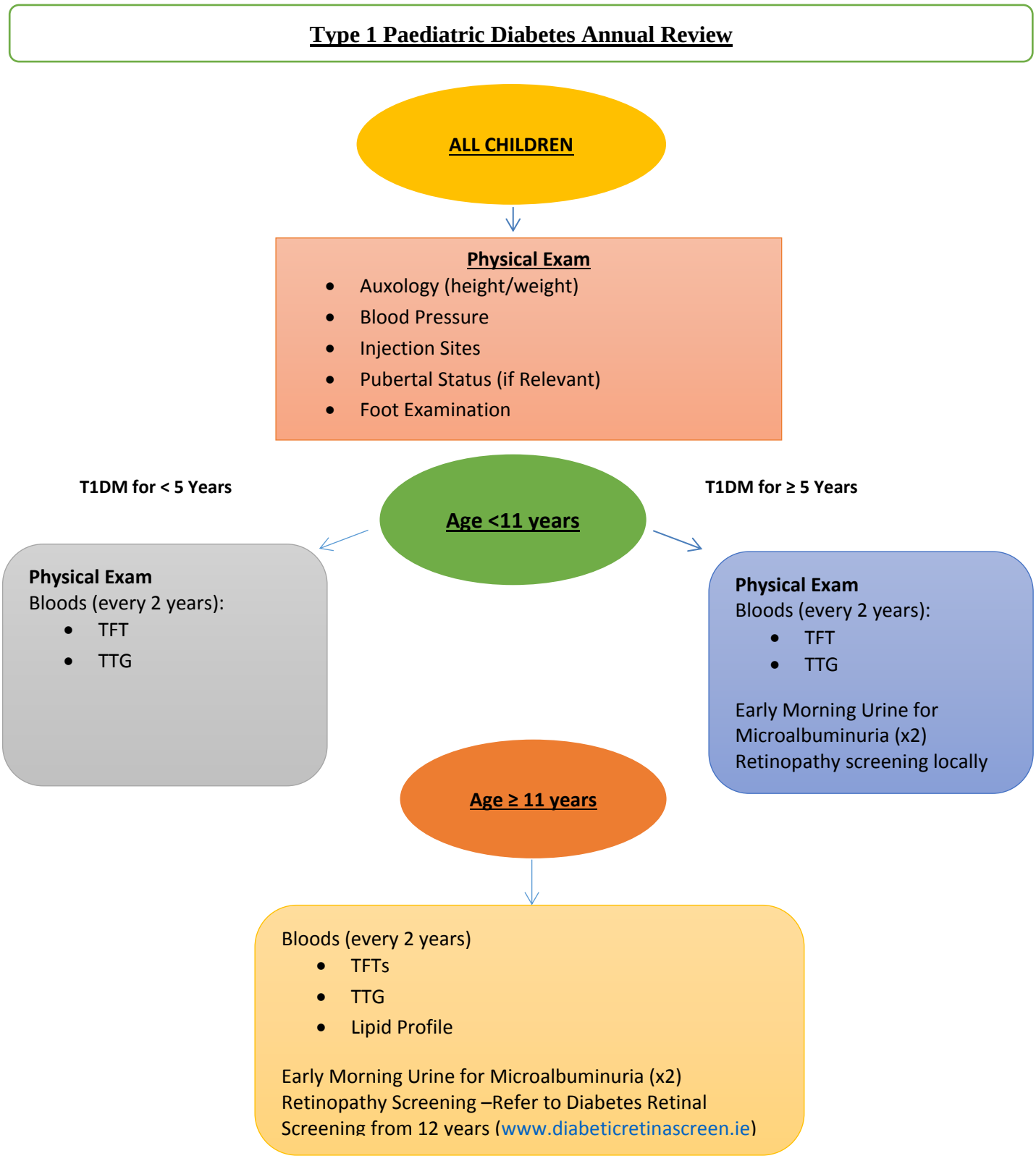
10.0 Qualifying Statement

- These guidelines have been prepared to promote and facilitate standardisation and consistency of practice.
- Clinical material offered in this guideline does not replace or remove clinical judgement or the professional care and duty necessary for each child.

- Clinical care carried out in accordance with this guideline should be provided within the context of locally available resources and expertise.
- This Guideline does not address all elements of standard practice and assumes that individual clinicians are responsible for:
    - Discussing care with the child, parents/guardians and in an environment that is appropriate and which enables respectful confidential discussion
    - Advising children, parents/guardians of their choices and ensure informed consent is obtained
    - Meeting all legislative requirements and maintaining standards of professional conduct

11.0 Appendices

Appendix 1 Annual Review Algorithm



Appendix 2 Acknowledgements

This guideline has been developed by the National Clinical Programme for Paediatric Diabetes Working Group. The members of this group include medical, nursing and dietetic representatives from paediatric diabetes services. The Working Group also wish to thank those who provided input and feedback on draft versions of this guideline throughout development, and those who provided valuable input during the consultation process. We are particularly grateful to the team at the National Centre for Paediatric Gastroenterology for their input and advice of coeliac screening in Type 1 diabetes.

Professor Nuala Murphy	National Clinical Lead Paediatric Diabetes, Consultant Paediatric Endocrinologist
Professor Declan Cody	Consultant Paediatric Endocrinologist
Ms. Aisling Egan	Clinical Nurse Specialist Diabetes
Dr Anna Clarke	Health Promotion and Research Manager, Diabetes Ireland
Dr Michael O'Grady	Consultant Paediatrician with Special Interest in Diabetes
Ms. Cathy Monaghan	Senior Paediatric Diabetes Dietitian
Ms. Shirley Beattie	Senior Paediatric Diabetes Dietitian
Dr Vincent McDarby	Senior Paediatric Psychologist
Dr. Claire Crowe	Senior Clinical Psychologist: Paediatric Diabetes & Endocrine Psychology
Ms. Cliodhna O Mahony	Programme Manager National Clinical Programme for Diabetes (Adult)
Ms. Claire Maye	Clinical Nurse Specialist Diabetes
Ms Jacqueline de Lacy	Programme Manager National Clinical Programme for Children

Appendix 3 Guidance Document Approval Process

Sign off by National Clinical Programme for Paediatric Diabetes Working Group	July 2020
Sign off by Paediatric Clinical Advisory Group, Faculty of Paediatrics, RCPI	August 2020
Sign off by National Clinical Advisory Group Lead (NCAGL), HSE	September 2020
Approved by the CCO CAG (23.10.2020)	October 2020
Guideline Revision Date	October 2023