SETTING	Acute and ambulatory medical areas
FOR STAFF	Acute and ambulatory medical areas Medical and nursing staff Children and Young people with type 1 diabetes and their families
PATIENTS	Children and young people with diabetes up to 17th birthday

For NNUHFT Paediatric and Young Persons Service from East of England Network Guideline 2020

"education is key to successful management of diabetes"

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NEWLY DIAGNOSED TYPE 1 DIABETES CARE PATHWAY FOR CHILDREN & YOUNG PEOPLE

(UP TO 19TH BIRTHDAY)

1. INTRODUCTION

Type 1 diabetes (T1DM), also known as insulin dependent diabetes is an autoimmune disease that permanently destroys beta cells in the pancreas, so that the body can no longer produce insulin. It is the most common form of diabetes in children and young people (CYP).

T1DM symptoms should be treated immediately, as without treatment with insulin it is not compatible with life.

Symptoms include:

- **History of polyuria/polydipsia**
- **Feeling tired**
- **Losing weight**
- Skin infections
- Genital itchiness

2. SCOPE

This care pathway is to be used by all staff in clinical areas caring for newly diagnosed Children & Young Person (CYP) with T1DM up to their 19th birthday. The care pathway will then be used by the CYP Diabetes team to continue care after discharge.

NB: when patients present with an elevated blood glucose who have a high BMI, or have a strong family history of type 2 diabetes, or may not have weight loss, continue to follow this care pathway but please discuss with the CYP Diabetes consultant (see Appendix 2) as other forms of diabetes may be considered.

CYP Diabetes Team: includes specialist CYP nurses, paediatric consultants, paediatric dietitians & paediatric clinical psychologists

3. PURPOSE

- To plan, facilitate and promote a safe, seamless initiation of insulin therapy
- To provide continuity and consistency of care, minimising duplication and gaps in care to CYP and families
- To ensure CYP and their families are given the appropriate education to enable them to continue management and become experts in their own
- diabetes management once discharged. The aim is a good quality of life and to reach their full potential (see Appendix 3)
- To minimise the risk of severe hypoglycaemia and diabetic ketoacidosis (DKA)
- To minimise prescribing errors
- To increase CYP/ families' satisfaction with the care and advice given

4. DEFINITIONS

World Health Organisation (WHO) diagnostic criteria[3] for diabetes based on blood glucose measurement and presence of symptoms:

1. **Random plasma glucose concentration of equal to or greater than 11.1mmol/L**

Random is defined as any time of day without regard to time since last meal.

OR

2. **Fasting plasma glucose of equal to or greater than 7.0mmol/L**

Fasting is defined as no caloric intake for at least 8 hours.

Note: ***Oral Glucose Tolerance Test (OGTT) is not required for diagnosis of TIDM.*** It is generally required for evaluation of suspected type 2 diabetes, monogenic diabetes or cystic fibrosis related diabetes.

5. BLOOD KETONES (BK)

Blood ketone measurement provides an accurate indicator of Diabetic Ketoacidosis (DKA). The blood ketone meters used in hospital, measures the blood ketone - β-hydroxybutyrate - directly. New patients are given a blood ketone meter for home use.

INTERPRETATION OF BLOOD KETONE MEASUREMENT	
Blood Ketones	**Significance**
Less than or equal to 0.6mmol/L	**Normal**
0.7 – 1.5mmol/L	**May require additional quick-acting insulin immediately. Inform doctor. Recheck blood glucose & blood ketones 2 hourly.**
1.6 – 2.9mmol/L	**AT RISK OF DKA** **Will require additional quick-acting insulin IMMEDIATELY (see page 8). Recheck blood glucose & blood ketones 2 hourly.**
Greater than or equal to 3.0mmol/L	**ASSESS FOR POSSIBLE DKA AS PER DKA GUIDELINE** ▪ **Up to 16th birthday use**: BSPED DKA ICP V1.2 & associated appendix ▪ **16th birthday onwards use**: The Management of Diabetic Ketoacidosis (DKA) in Adults– CGSG 119

6. DUTIES

Acute area staff (medical & nursing staff): print the care pathway from the print the care pathway from the Intranet and begin working through the pathway.

CYP Diabetes Team: support the acute area staff and continue working through the pathway with the CYP/family on discharge.

7. KEY MESSAGE

Families, children and young people with diabetes benefit greatly from a good start to diabetes care with confident, clear, positive messages, support and advice (NICE 2015-updated 2018)[4]. The International Society of Paediatric & Adolescent Diabetes (ISPAD)[5] recommends that from the outset care should be patient-focused with an emphasis on the CYP and relevant family members should receive care from an MDT comprising of specialists in both diabetes and paediatrics with specialist medical care.

8. NEWLY DIAGNOSED TYPE 1 DIABETES CARE PATHWAY FOR CHILDREN & YOUNG PEOPLE (UP TO 19TH BIRTHDAY)

Name : *(Use sticker)*	NHS no.	Date:
Address:	Hospital no.	Time:
DOB:	GP:	Consultant:

Seen in (department):	Admitted to:

INITIAL RAPID ASSESSMENT

On presentation assess:

- **A**irway
- **B**reathing
- **C**irculation
- **D**isability

✓	✗

Are any of the following present?

- blood pH < 7.30 or Bicarbonate <15mmol/L
- Blood glucose > 11.1mmol/L
- Blood ketones > 3mmol/L
- And/or dehydration > 5%

If so, consider **DKA AND IMMEDIATELY** discuss with consultant on call. (see Appendix 1)

DKA YES ☐ NO ☐

N.B. If child is in Diabetic keto-acidosis and in a paediatric setting use **BSPED DKA ICP V1.2 & associated appendix (V2)** or **The Management of Diabetic Ketoacidosis (DKA) in Adults if young person is in an adult setting** policy first Trustdocs17464

N.B. If CYP is in Diabetic keto-acidosis use The Integrated Care Pathway for Children and Young People with Diabetic Ketoacidosis ,up to the age of 17 years if under paediatric care, (or The Management of Diabetic Ketoacidosis (DKA) in Adults , if over 16years and admitted to adult care) .Print from Intranet. Clinical guidelines/ paediatrics/diabetes/ BSPED Integrated Care Pathway for CYP with DKA) Trustdocs17464

Staff details to be recorded in full below, then initials may be used within the document.

NAME:	SIGNATURE:	TIME	DATE	Initials

ALL CYP's presenting with newly diagnosed diabetes require the blood tests • below

BLOODS to take:	(✓)	Date	Initial	BLOODS to take:	(✓)	Date	Initial
• Thyroid function				Blood culture if febrile			
• Thyroid Perioxide antibodies				Urine culture if febrile			
• HbA1c				CRP if febrile			
• Lab glucose				Amylase if severe abdominal pain			
• FBC, U&E, LFT				Further infection screen dependent on clinical assessment			
• Coeliac screen							
• GAD antibodies							
• Islet- Antigen 2 (IA-2)							

PLEASE NOTE: items with * denotes education and training sections or part-sections that **must be** provided to the child/young person & family before discharge.

***On diagnosis, CYP <u>MUST</u> be discussed with a senior member of the Children & Young Persons (CYP) diabetes team within 24 hours of presentation.**

Date:	Time:	Discussed with:	Name/signature/designation:

Each CYP to be seen by a member of the Diabetes Team on the next working day (Monday – Friday).

Date:	Time:	Seen by:	Name/signature/designation:

It is essential the above information is documented (See Appendix 2)- it is a Best Practice Tariff (BPT) for Diabetes requirement.

USEFUL CONTACTS:

Monday – Friday).

USEFUL CONTACTS:

Diabetes Nursing Team office: Tel: 01603 287504 (option 2) or

Email: pdsn@nnuh.nhs.uk

Diabetes out of Hours Service for patients: Tel: 01603 286286 (ask for Children's Assessment Unit)

(5pm to 8am Monday - Friday and 24 hours weekends and bank holidays).
Health care professionals may seek 24 hour advice through the on-call service. Please see the on –call folders for the escalation policy prior to calling the team (Appendix 1)

Ensure that diabetes training is commenced and documented. Key information and practical skills that CYP with type 1 diabetes need to know before they leave hospital are:

- **How to do BG (blood glucose)**
- **How to administer insulin**
- **Awareness of hypoglycaemia and management if BG near normal range before discharge**

9. ADMISSION

Discuss with a member of the Diabetes Team (MDT)- see Appendix 2- All Newly diagnosed CYP should be admitted for education and support, as some families need time to adjust to the diagnosis even if not ketoacidotic.

Children under 6 months of age must be discussed with the Diabetes Paediatric consultant on call and those under 6 weeks may need to be transferred to a tertiary centre.
Patients above 16 years of age are likely to be admitted to adult wards and managed by the adult medical/diabetes teams in collaboration with the CYP Diabetes Team
Team (see Trust Guideline re management of Young People aged 16-18 years who present in DKA)

10. INSULIN

All CYP should be commenced on Multiple Daily Injection (MDI) insulin regimen at diagnosis. CYP on MDI insulin regimen take a once daily basal insulin in the evening (before bed) and rapid acting insulin before carbohydrate containing food.

Give a **Total Daily Dose (TDD) of 0.75units/Kg**.
For children less than 5 years, consider 0.5 units/Kg total daily dose.

CYP under 12 years require: 0.5 unit Novo pen Echo (red) for insulin Novorapid & 0.5 unit Novo pen Echo(Blue) for Degludec(or Levemir if under 2 years of age)

CYP over 12 years require: 0.5 unit Novo pen Echo (red) for insulin Novorapid & either 0.5u Novo pen Echo Blue for Degludec cartridges or Degludec Flexi pen (1 unit increments)

TABLE 1: Use Appendix 1

MULTIPLE DAILY INJECTION REGIMEN:	**EXAMPLE:**
Calculate total daily dose (TTD) as above :- Prescribe on EPMA/ paper chart Insulin Degludec 30% of TDD: Once a day in the evening (use Levemir 40% of TTD in the morning if under 2 years) Insulin NOVORAPID Calculate insulin to carb ratio based on 300, 400 or 500 rule and correction based on 100 rule(as box below on page 7) Print dose planner from S/Drive/Jenny Lind Diabetes Team/ Pump and MDI folder	Weight = 20Kg x 0.75 units/Kg: TDD = 15 units Therefore: 1. Insulin Degludec (Tresiba):4.5 Units 2. Insulin NOVORAPID: Insulin to Carb ratio= 400/15 =26.66 (Use ICR 1:27) Correction factor 100/15 =6.66 (Use correction factor 1:7)

ALL CYP newly diagnosed with type 1 diabetes need to be treated with insulin regardless of the
time of day of diagnosis.
If the time of diagnosis does not fit with the insulin timings above i.e. it is not a meal time or bedtime then give Insulin NOVORAPID as a correction/ STAT dose, to treat hyperglycaemia and commence Basal/ Bolus regimen at the first mealtime .

ALWAYS prescribe STAT dose of Insulin NOVORAPID on the STAT section of the

drug chart. It is important to use **Insulin NOVORAPID** as this will reduce BG and 'switch off' blood ketone production.

	(✓)	Date	Initial
*Demonstrate to parents and CYP how to use their insulin pen and perform an **injection;** encourage them to practise			

11. BLOOD GLUCOSE (BG) MONITORING

The CYP and family will have a home blood glucose meter **in their starter pack.** It is important they become confident in its use. **Ensure they know the meter & finger pricking device are single person use only.**

NB. If the CYP is an in-patient, any insulin dose adjustments must be made using the blood glucose reading obtained from the Trust calibrated (point of care) blood glucose meter (please ensure patients use their own finger-pricker device).

	(✓)	Date	Initial
• *Demonstrate to CYP and family how to use their BG meter as soon as possible; once they are confident, encourage them to use meter • *Check BG levels at least 6x/day including pre-meals, after school and pre-child/ parents bedtime. Do not do BG levels during the night unless the CYP feels unwell • Discuss exporting App data/data download facilities e.g. Glooko, with family & provide details of how to do/set up an account and download			

If BG is less than 4mmol/L refer to the Guideline for Management of Hypoglycaemia If CBG is less than 4mmol/L refer to the Guideline for Management of Hypoglycaemia (on the intranet)

12. BLOOD KETONE (BK) MONITORING

CHECK BK ON ADMISSION:	(✓)	Date	Initial

• BK < 1.6mmol/L repeat at next BG check.
• BK greater than or equal to 1.6mmol/L give Insulin Novorapid without delay.
  ○ If this coincides with a mealtime use the calculations in TABLE 1 pg. 7. **Repeat BK after 2 hours**.
  ○ If not a mealtime, give Insulin Novorapid dose at 10% of calculated TDD in TABLE 2 pg 9. **Repeat CBK after 2 hours**.
• If BK continue to be greater than or equal to 1.6mmol/L repeat STAT dose of Insulin Novorapid as above leaving a minimum of 2 hours between Insulin Novorapid correction doses calculated using TABLE 2. Report static or increasing BK levels to doctors for advice re: further management- **see Appendix 2**-. **NB: BK levels should reduce once insulin therapy has commenced.**
• Once BK less than1.6mmol/L repeat BK with next BG to avoid multiple finger-prick checks.
• Once BK levels are 0.6mmol/L or below no further BK testing required unless the CYP deteriorates(NB: BK of greater than 0.6mmol/L should not delay discharge in a well-child with reducing BG)
• The CYP Diabetes nurses will educate family re: use of BK testing meter in starter pack after discharge.			

13. MANAGEMENT OF ELEVATED BG LEVELS DURING FIRST FEW DAYS AFTER DIAGNOSIS

The blood glucose levels will 'run high' for the first few days. There is no need to keep correcting with extra doses of insulin Novorapid in between regular doses unless BG **is >14mmol/L.** Constantly giving small amounts of insulin Novorapid in a newly diagnosed child who is well, is unnecessary.

TABLE 2: Use Appendix 1

If BG is greater than 14mmol/L

- **If CBG is greater than 14mmo/l three hours after the last bolus dose a further correction dose of Novorapid should be given. (If correction dose is not known give 10% of TDD of insulin as a correction dose).**
- **If they have a dose planner the correction dose will be there or**
- If MySugr app has been **commenced use correction bolus advice from MySugr app**

EXAMPLE FOR CALCULATING CORRECTION:

Child weight = 40Kg TDD of 30units (if starting on 0.75 units/Kg/day)

10% = 3 unit correction dose of Insulin NOVORAPID.

- **Correction dose can be given between meals or at night or dose added to mealtime insulin dose if due.**
- **Correction doses should have a minimum 2 hour gap between doses and check BG 2 hours after a correction dose is given.**

Always prescribe correction dose of Insulin NOVORAPID on the 'ONCE ONLY PRESCRIPTION' section of the drug chart (ensure UNITS is written in full)

During next few days insulin doses will be adjusted by the family with the support of the CYP diabetes team.

14. DIETARY INTAKE

Explain to parents:	(✓)	Date	Initial
• *In the first few weeks following diagnosis CYP will often eat more than they would normally. This is usual and will settle. • *CYP requires a **healthy, balanced and age appropriate diet.** Sweets and chocolate are can be included but are best consumed after a main meal with insulin. • *Carbohydrate should be included with each meal. Snacks are not essential but in the first few weeks are expected due to increased hunger. • *CYP requires **sugar free drinks**. Diet fizzy drinks or squash with no added sugar are acceptable. • *Some ideas for healthy snacks: fruit & veg are the best snack options, veg sticks with hummus, natural yoghurt, 1-2 rice cakes (with e.g. cream cheese & cucumber), seeded toast/Granary with low fat spread, cheese/sliced meat, 1 slice malt loaf, 1 fruited teacake. • Carbohydrate counting education will commence with family/young person at diagnosis and family will be seen by dietician for in depth carb counting education			

Once carbohydrate counting education has been initiated by CYPD team, advise families:

STARTING CARBOHYDRATE RATIO			STARTING INSULIN SENSITIVITY FACTOR (ISF)
Under 5 years old: use 300 rule	**5 - 11 years old: use 400 rule**	**Over 11 years old: use 500 rule**	**100 rule**
Carbohydrate ratio:		Dose planner provided	Type:
Insulin Sensitivity factor:			Date:

15. EDUCATION (see Appendix 3)

*Encourage CYP and parents to begin reading the Education Booklet in the Starter Pack. Ask them to write down questions they have. if able, download the Digibete app on their smartphone and link to **NNUH clinic code SRGMM**. Ask them to write down questions they have.

	(✓)	Date	Initial
• *Aim of treatment is to maintain BG levels pre-meal **4 – 7mmol/L** and post meal **5- 10mmol/L** as often as possible. For those intending to drive BG must be above **5mmol/L** before driving. • *Explain to parents and CYP **about hypoglycaemia (BG level <4mmol/L),** its causes and how to treat. This is most important for those with BG levels near normal range during admission. Please refer to hypoglycaemia information in **Education Booklet in starter pack.** • CYP Diabetes Team – Download Digibete/DEAPP • CYP Diabetes Team – blood ketone testing • CYP Diabetes Team - glucagon training May take place after discharge • CYP Diabetes Team - hyperglycaemia and illness management • CYP Diabetes Team - exercise • CYP Diabetes Team - relevance of HbA1c & BG 'time in target'			

16. REFERRALS & MULTI-DISCIPLINARY TEAM

	(✓)	Date	Initial
• Refer to CYP Diabetes Dietitian at diagnosis to commence/continue carbohydrate (CHO) counting education • CYP Diabetes Team to inform Paediatric Psychologist of diagnosis. • CYP Diabetes team to complete GP letter regarding diagnosis and repeat prescription requirements. GP letter must be sent securely to GP by the end of the second working day after discharge. • CYP Diabetes Team to make OPA within 2 weeks in the appropriate clinic.			

17. SUPPLIES FROM PHARMACY

MDI Regimen (under 2 years)	MDI Regimen (over 2 years)
• Insulin NOVORAPID 3mL PENFIL CARTRIDGES X 5 • Insulin LEVEMIR 3mL PENFIL CARTRIDGES X3 *Provide Novopen*	• Insulin NOVORAPID 3mL PENFIL CARTRIDGES X 5 with Novopen Echo red x1 • Insulin Degludec 3mL cartridges x5 with Novopen echo blue x1 or

	• Degludec novo pen x5 (for aged over 12 years only)

PLUS:

- Glucogel x 1 box
- Glucagon im injection (dose for weight)

Add local e-prescribing details here if appropriate or add an Appendix			
SUPPLIES HAVE BEEN ORDERED FROM PHARMACY	**(✓)**	**Date**	**Initial**

18. DISCHARGE

	(✓)	Date	Initial
• *Discharge weight • *Provide the CYP and family with **24-hour telephone contact numbers** card and explain who and how to contact for support. Check postal address and family telephone contact numbers – document them. • *Admitting Medical Team to review available blood results before discharge & inform CYP Diabetes Team of any pending results. • **If CYP Diabetes Team have not seen the patient before discharge please call 01603 287504(option 2 and leave a message) and email pdsn@nnuh.nhs.uk • CYP Diabetes Team to review pending/diagnostic blood results.			

19. FOLLOW UP

- Family will be contacted by The CYP Diabetes Team following discharge. Home and school training will be arranged as appropriate.
- All children with T1DM should have access to 24 hours telephone advice.
- All school aged children require a school care plan in place before return to school (the school care plan will be completed jointly by the family, school staff, C&YP Diabetes Team & School Health Team).

CONTENTS OF DIABETES STARTER PACK (RUCKSACK) FOR FAMILY:

• Accu-chek Instant meter	• Novopen Echo Plus Red (all ages)

• Accu-chek Fastclix lancet drums x 2 boxes • Accu-chek Instant Test strips 50 strips • Caresens Blood Ketone Test meter & 2 ketone strips • CYP Diabetes Education Booklet *Rucksack for under 11 years has a teddy.*	• Novopen Echo Blue • Small sharps bin • Red diabetes community folder • Business card with telephone numbers for CYP Diabetes Team & CYP Diabetes Out of Hours Service

It may be necessary for CYP to return to **CAU or outpatient** department if they require additional support with injections and/or CBG monitoring until CYP Diabetes Team becomes available. The CYP Diabetes Team will continue care after discharge.

Follow Up

- Family will be contacted by The CYP Diabetes Team following discharge. Home and school visits will be arranged as appropriate and within current infection control guidance.
- All children with T1DM should have access to 24 hours telephone advice.
- All school aged children require a school care plan in place either before or soon after return to school (the school care plan will be completed jointly by the family, school staff, C&YP Diabetes Team and School Health Team).

APPENDIX 1 -

24 hour ADVICE / ESCALATION PATHWAY FOR: CHILDREN and YOUNG PEOPLE WITH DIABETES (CYPD)

Please read the escalation policy before contacting the team. Contact should only be made by Registrar level and above.

On diagnosis a child or young person (CYP) is to be *discussed* with a senior member of the CYPD team within 24hrs of presentation.

Referrals to the Diabetes team must be done by HCP mobile contacts should NOT be given out to families. The usual escalation process should be used up to the on call Consultant

↓

09:00 – 17:00 weekdays

Provided by the CYPD Team: 01603 287504 OR x3065 dect phone direct

Weekdays after 17:00, W/E & bank holidays

Provided by Paediatric Diabetes Team Via switchboard

All Newly Diagnosed CYP with Diabetes (CYPD) must be *seen* by a specialist paediatric diabetes team member on the next working day.

↓

09:00 – 17:00 weekdays

Contact CYPD team on: : 01603 287504 OR x3065 dect phone direct once diagnosis is confirmed

If out of hours: leave a message for the team on the same office number above OR email patient details to pdsn@nnuh.nhs.uk

Weekdays after 17:00, W/E & bank holidays

Provided by Paediatric Diabetes Team Via switchboard

The team will call back the next working day to arrange follow up.

ON-GOING ACCESS TO ADVICE HCP

The provider Unit must provide 24hr access to fellow HCP on management of diabetes admitted acutely with a clear escalation policy as to when further advice on managing diabetes emergencies should be sought. Provided by the usual escalation process should be used up to the on call Consultant or Registrar

↓

09:00 – 17:00 weekdays

Contact CYP Diabetes team on: 01603 287504 OR x3065 dect phone direct.

Weekdays after 17:00, W/E & bank holidays

Contact Paediatric Diabetes Team via switchboard

PATIENT/CARER ADVICE

The Provider Unit should provide 24hr access for all CYP with diabetes and their families for specific paediatric diabetes support.

CYP / parents are instructed to contact Children's Assessment Unit 01603 289774 OOH for advice. If advice is given out of hours: leave a message for the team on the same office number above OR email patient details to pdsn@nnuh.nhs.uk

↓

Out of Hours service (OOH)

Provided by the paediatric diabetes team contact via switchboard holding the rota

After hours 17:00 – 08:00, at weekends and bank holidays telephone support to CYPD and their families within the consortium.

On advice of Paediatric Diabetes consultant CATS (Children's Acute Transfer Services) would be contacted for treatment / transfer advice.	

Appendix 2

Education topics to be covered at Diagnosis and the first month following diagnosis. Structured education resources and Digibete are available to support education.

Topic	Date	Name	Signature	Designation
What is Diabetes?				
Causes & symptoms				
Explanation of Remission (Honeymoon) Period				
Insulin				
Different types of insulin, action & duration of action				
Dosages				
Use of correction doses				
Storage				
Leaflets				
Injections				
Technique				
Sites/rotation				
Use of pen/pump device				
Timing of insulin injections				
Disposal of sharps				
Capillary Blood Glucose Monitoring (CBGM)				
Why, how and when to check				
Target range and 'time in target'				
When and how to seek advice				
Ketone Testing				
Why, how and when to check				
Interpretation of results and actions to take				
When and how to seek advice				
Hypoglycaemia				
What is hypoglycaemia				
Causes/symptoms/prevention				
Management				
Dietary Advice				
Healthy eating				
Carbohydrate awareness/counting				
Exercise Management				
When to CBG monitor				
How to manage carbohydrates and insulin				
Illness Management				
Illness management and Diabetic Ketoacidosis prevention				

24hr Telephone contact numbers				
School				
School care plan				
Equipment for school including hypoglycaemia treatment				
Identifying a place to CBG monitor and inject				
Prescriptions				
When and how to obtain repeat prescription items				
Identification				
Medic alert / diabetes card				
Disability Living allowance				
Where to obtain form and access help to complete e.g. DUK				
Support Groups/ Services				
DUK, JDRF, East of England face book group				
Provide Information relating to impact of diagnosis and emotional well-being and how to access psychology support				

Appendix 3. Ambulatory Management of Mild DKA

Introduction:

A child who has mild DKA and appears well may be suitable for ambulatory management, with subcutaneous insulin and oral rehydration. Approximately 40% of children with confirmed DKA will fall into this category. **The decision to manage a child in this way should be discussed with the on-call consultant or a member of the diabetes team.**

Criteria for diagnosis of mild DKA:

- Appears well and able to tolerate oral fluids and food.
- PH 7.200- 7.299

Management:

- Administer a **Correction Dose** or 10% of TDD (total daily dose) of rapid-acting insulin analogue (eg: Novorapid, Humalog or Apidra) by **subcutaneous injection using an insulin pen** *as soon as possible.*
- The dose required can be calculated using the "The 100 Rule" (see below). This is a simple formula for calculating the expected drop in blood glucose produced by 1 unit of rapid insulin. This is called the Correction Factor (CF). Note that " the 100 rule" applies to all children treated using ambulatory management, ***including patients on insulin pumps***

The 100 Rule	**Example**
CF = 100 ÷ Total Daily Dose of Insulin The goal is to administer sufficient insulin to reduce the blood glucose below 10 mmol **Correction Dose = (Blood glucose ‗ 10)** **CF** Round fractions to convenient dose	*A child on total daily dose of 21 units, with a blood glucose of 29.8 mmol/L* Correction Factor = 100 ÷21 =4.8 Correction Dose = (29.8 – 10)÷ 4.8 = 19.8÷ 4.8 = 4.1 **Required dose = 4 u** *(round to nearest convenient dose)*

The initial correction dose of insulin may be repeated after 2-3 hours, if there is insufficient response to the initial injection. The child should start or resume their normal insulin therapy, (adjusted as appropriate for hyperglycemia), as soon as is convenient (usually at a normal meal time).

For newly diagnosed children in DKA, the Total Daily Dose can be calculated as follows:

TDD= 0.75 ×Body weight (kg)

See also new patient guideline:Initiate treatment as per the new patient guideline when the clinical condition has improved.

Monitoring:

• Hourly blood glucose and ketone measurements • 2-4 hourly blood gas measurements • Frequent clinical assessments	**Lack of clear resolution of acidosis/ketosis or hyperglycaemia within 4-6 hours or the patient becoming less well, is an indication for standard DKA therapy with IV fluids and insulin.**

APPENDIX 3 (each unit to adapt to their own educational needs)

Education topics to be covered at Diagnosis and the first month following diagnosis

TOPIC	DATE	Name	Signature	Designation
What is Diabetes?				
Causes & symptoms				
Explanation of Remission (Honeymoon) Period				
Insulin				
Different types of insulin, action & duration of action				
Dosages				
Use of correction doses				
Storage				
Leaflets/Apps/Websites				
Injections				
Technique				
Sites/rotation				
Use of pen/pump device				
Timing of insulin injections				
Disposal of sharps				
Capillary Blood Glucose Monitoring (CBGM)				
Why, how and when to check				
Target range & 'time in target'				
When & how to seek advice				
Discuss Libre/Dexcom sensors				
Ketone Testing				
Why, how and when to check				
Interpretation of results and actions to take				
When & how to seek advice				
Hypoglycaemia				
What is hypoglycaemia				
Causes/symptoms/prevention				
Management				
Dietary Advice				
Healthy eating				
Carbohydrate awareness/counting				
Exercise Management				
When to BG monitor				
How to manage carbohydrates & insulin				
Illness Management				
Illness management and Diabetic Ketoacidosis prevention				
24hr Telephone contact numbers				
School				

School care plan				
Equipment for school including hypoglycaemia treatment				
Identifying a place to BG monitor & inject				
Prescriptions				
When & how to obtain repeat prescription items				
Identification				
Medic alert / diabetes card				
Disability Living allowance				
Where to obtain form & access help to complete e.g. DUK				
Support Groups/ Services				
DUK, JDRF, East of England face book group				
Provide Information regarding the impact of diagnosis on emotional well-being,				
Provide information on how to access psychology support				

20. MONITORING COMPLIANCE

- Audit of care pathway
- Monitor any adverse incidents as per Trust policy

21. REFERENCES

1)Juvenile Diabetes Research Foundation: https://jdrf.org.uk/information-support/about-type-1-diabetes/facts-and-figures/

2) Diabetes UK (DUK) 2012. 4 T's Campaign www.diabetes.org.uk

3) World Health Organisation (WHO) 2006. Definition and Diagnosis of Diabetes Mellitus and Intermediate Hyperglycaemia. WHO & International Diabetes Federation. WHO Document Production Services, Geneva, Switzerland https://www.who.int/diabetes/publications/Definition%20and%20diagnosis%20of%20diabetes_new.pdf

4) National Institute for Health and Care Excellence (2015-updated 2023) Diabetes (type 1 and type 2) in children and young people: diagnosis and management (ng 18)

5) International Society of Paediatric & Adolescent Diabetes (ISPAD) Consensus Guidelines 2022. www.ispad.org