

# Paediatric Intensive Care Unit

## Paediatric Diabetic Ketoacidosis on PICU and HDU

Staff relevant to:	All members of staff working on PICU & HDU within UHL
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Written by:	Hazel Perrett
Reviewed by:	Hazel Perrett
Trust Ref:	C67/2019

### 1. Introduction and Who Guideline applies to

This summary sheet applies to paediatric patients being treated on PICU & HDU only. It does **NOT** replace the Children's Hospital diabetes guidelines. Please refer back to the Children's Hospital diabetes guidelines for detailed management and management of children outside of PICU & HDU.

#### Related documents:

**Diabetes (Including Diabetic Ketoacidosis) UHL Childrens Hospital Guideline – UHL ref: C10/2019**

# Paediatric Diabetic Ketoacidosis on PICU and HDU

## General Management

- Hourly blood glucose
- Hourly fluid input & output
- Neurological status at least hourly
- Electrolytes 2 hours after start of IV therapy then 4 hourly
- 1-2 hourly blood ketone levels
- A, B, C, D, E; Vital signs, ECG, BP
- Blood gas 2-4 hourly
- NBM – regular mouth care
- Hyperthermia not a common part of DKA

**Every newly diagnosed child with diabetes should be given a blue starter kit bag by A&E.**

## Insulin

If available use pre-filled syringes containing 50 units of soluble insulin (Actrapid) in 50 ml 0.9% sodium chloride.

0.05-0.1 units/kg/hr

Infusion: 50 units of soluble Actrapid in 50mls of 0.9% NaCl

Prime IV line for 20 minutes

## Signs of Cerebral Oedema

- Agitation or irritability
- Headache
- Unexpected fall in HR
- Increase in BP
- Reduced GCS

## Blood sugar and ketones

Please use child's own lancet pen for blood glucose and ketone monitoring!

Only use blue/pink lancets if child is shut down!

## Calculating corrected sodium (based on lab results)

$$\text{Corrected Na} = \text{measured Na} + (\text{Glucose} - 5.5) / 3.5$$

(Glucose – 5.5, then divide by 3.5, then + sodium)

Corrected Na should rise with therapy as blood glucose falls, failure to increase/drop = Risk of Cerebral Oedema! Consider changing fluid rate

## Calculating Fluids

### 1. Deficit:

DKA classification	pH	Bicarbonate	Percentage of dehydration
Mild DKA	7.2 – 7.29	&/or < 15 mmol/l	5%
Moderate DKA	7.1 – 7.19	&/or < 10 mmol/l	7%
Severe DKA	< 7.1	&/or < 5 mmol/l	10%

Do not subtract fluid boluses used to treat shock up to 40mls/kg

### 2. Fluid Requirement:

Weight	Maintenance fluid
< 10kg	100ml/kg/day
10 -20 kg	1000 mls + 50ml/kg for the next 10 to 20 kg
>20kg	1500 mls + 20ml/kg/day for each additional kilogram above 20kg

Fluid calculations should be calculated and checked by two individuals

### 3. Maintenance over 48 hours: Total fluid hourly rate = {(Deficit – Initial bolus) / 48 hr} + Maintenance per hour

Deficit	Estimated % dehydration x body weight (kg) x 10 (amount in mls)	mls
Initial bolus (e.g. 10mls/kg)	Minus from deficit total (not to subtract if given for shock)	mls
	Divide by 48 (hrs)	Deficit = mls/hr/48hrs
100% Fluid maintenance	Divide by 24 (hrs)	Fluid maint. = mls/hr/24hrs
	Add fluid maintenance to deficit	Total = mls/hr

## Continuing Management

Blood Glucose	Blood Ketones	Insulin Infusion	IV Fluids
> 14 mmol/l	> 3.0 mmol/l	Maintain 0.05-0.1 units/kg/hr	0.9% sodium chloride with 20 mmol potassium chloride in 500ml bag
> 14 mmol/l	< 3.0 mmol/l	Maintain 0.05-0.1 units/kg/hr	0.9% sodium chloride with 20 mmol potassium chloride in 500ml bag
<14 mmol/l	> 3.0 mmol/l	0.1 units/kg/hr	0.9% sodium chloride with 10% glucose and 20 mmol potassium chloride in 500ml bag
<14 mmol/l	< 3.0 mmol/l	0.05 units/kg/hr	0.9% sodium chloride with 5% glucose and 20 mmol potassium chloride in 500ml bag
< 6 mmol/l	> 1.0 mmol/l	0.05 units/kg/hr	0.9% sodium chloride with 10% glucose and 20 mmol potassium chloride in 500ml bag
< 4 mmol/l	N/A	Stop for 1 hour	Give 10% glucose bolus 2ml/kg stat. Increase glucose concentration 0.9% sodium chloride with 10% glucose and 20 mmol potassium chloride in 500ml bag
< 14 mmol/l	< 1.0 mmol/l	Stop infusion after 30 minutes	Clinically well, drinking well, pH normal, start SC insulin

**Please refer back to the guideline for detailed management: Diabetes (Including Diabetic Ketoacidosis) UHL Childrens Hospital Guideline**

NB: Paper copies of this document may not be most recent version. The definitive version is held on InSite in the [Policies and Guidelines Library](#)

# Paediatric Diabetic Ketoacidosis on PICU and HDU

Name:  
Date of birth:  
S number:

Date:

Time	Blood sugar	Ketones	Corrected sodium	Fluids				Comments
				0.9% NaCl & 20mmols KCL in 500mls	0.9% NaCl, 10% Glu & 20mmols KCL in 500mls	0.9% NaCl, 5% Glu & 20mmols KCL in 500mls	Other	
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### **3. Education and Training**

Please see [Diabetes \(Including Diabetic Ketoacidosis\) UHL Childrens Hospital Guideline](#)

### **4. Monitoring Compliance**

Please see [Diabetes \(Including Diabetic Ketoacidosis\) UHL Childrens Hospital Guideline](#)

### **5. Supporting References**

NICE 2022. NG 18 diabetes-type-1-and-type-2-in-children-and-young-people-diagnosis-and-management <https://www.nice.org.uk/guidance/ng18/resources/diabetes-type-1-and-type-2-in-children-and-young-people-diagnosis-and-management-pdf-1837278149317>

### **6. Key Words**

**Blood, Diabetic, Diabetes, Glucose, Ketoacidosis, Insulin**

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.  
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

CONTACT AND REVIEW DETAILS					
<b>Guideline Lead (Name and Title)</b> Hazel Perret – Deputy Sister Charge Nurse		<b>Executive Lead</b> Chief Nurse			
<b>Details of Changes made during review:</b> <b>Corrected Na = measured Na + (Glucose - 5.5)/ 3.5 changed from (glucose 5.6) /3.5</b> <b>Added</b> - Do not subtract fluid boluses used to treat shock up to 40mls/kg & Fluid calculations should be calculated and checked by two individuals Amended insulin infusion to – <table><tr><td>&gt; 14 mmol/l</td><td>&gt; 3.0 mmol/l</td><td>Maintain 0.05-0.1 units/kg/hr</td></tr></table> (Previously Maintain 0.1 units/kg/hr)			> 14 mmol/l	> 3.0 mmol/l	Maintain 0.05-0.1 units/kg/hr
> 14 mmol/l	> 3.0 mmol/l	Maintain 0.05-0.1 units/kg/hr			