

Patient Selection and initiation of continuous subcutaneous insulin infusion pump (CSII) - Full Paediatric Clinical Guideline – Joint Derby & Burton

Reference no.: CH CLIN D09/July 22/V007

1. Introduction

The guideline applies to children and young people with Type 1 diabetes mellitus cared for by the Derbyshire Children's Hospital and the Queen's Hospital, Burton multidisciplinary paediatric diabetes teams.

2. Aim and Purpose

To support the Derbyshire Children's Hospital and the Queen's Hospital, Burton multidisciplinary paediatric diabetes teams in:

- Appropriate selection of children and young people (CVP) with Type 1 diabetes mellitus for Continuous Subcutaneous Insulin Infusion (CSII) therapy.
- Training and ongoing management of children and young people with Type 1 diabetes mellitus using CSII therapy.
- For emergency management of CSII therapy please see guideline CH CLIN D14
- For patients using CSII therapy undergoing surgery please see guideline CH CLIN D06
- For patients using CSII therapy in diabetic ketoacidosis (DKA) please see DKA guideline CH CLIN D03.

3. Definitions, Keywords

Continuous subcutaneous insulin infusion (CSII) therapy is also known as insulin 'pump' therapy.

The paediatric diabetes multidisciplinary team (MDT) includes consultant paediatricians with a specialist interest in diabetes, paediatric diabetes specialist nurses (PDSN), paediatric dietitians with an interest in diabetes and clinical psychologists.

Key words: insulin pump, diabetes

4. Main body of Guidelines

Pump therapy must be initiated by a specialist team with training in pump therapy, including a consultant paediatrician, a paediatric diabetes specialist nurse and a dietitian. The specialist team should provide structured education programmes and advice on diet, lifestyle and exercise appropriate for people using CSII.

Patient selection

A child or young person will only be considered for insulin 'pump' therapy if they meet the criteria in the NICE guidance NG18 (2015):

Continuous subcutaneous insulin infusion therapy is recommended as a treatment option for **adults and children 12 years and older** with type 1 diabetes mellitus provided that:

Attempts to achieve target haemoglobin A1C (HbA1c) levels with multiple daily injections (MDIs) result in the person experiencing disabling hypoglycaemia.

For the purpose of this guidance, disabling hypoglycaemia is defined as the repeated and unpredictable occurrence of hypoglycaemia that results in persistent anxiety about recurrence and is associated with a significant adverse effect on quality of life.

or

HbA1c levels have remained high (that is at 69mmol/mol or above) on MDI therapy (including, if appropriate, the use of long acting insulin analogues) despite a high level of care.

CSII therapy is recommended as a treatment option for **children younger than 12** years with type 1 diabetes mellitus provided that:

MDI therapy is considered to be impractical or inappropriate, and

Children on insulin pumps would be expected to undergo a trial of MDI therapy between the ages of 12 and 18 years.

If the child or young person meets the NICE criteria, they will be discussed at a MDT meeting. A decision whether to proceed or not will be based on clinical need, the family's wishes/suitability and will take into account the assessments conducted by all members of the MDT. The outcome of the team discussion must be documented in the medical notes.

Waiting list

Once the CYP is agreed by the MDT, they will be added to the pump waiting list. Each site will operate their own waiting list. The timing of the pump start for CYP will be prioritised by both time on waiting list and clinical need. The waiting list will be reviewed every 3 months in the site MDT meeting to decide on priorities for the next 3 months.

Choice of device

All device options available for the CYP will be discussed and the CYP/carer will be counselled on advantages of each system. When making the decision, consideration of option to use as hybrid closed loop must be made. A saline trial can be offered.

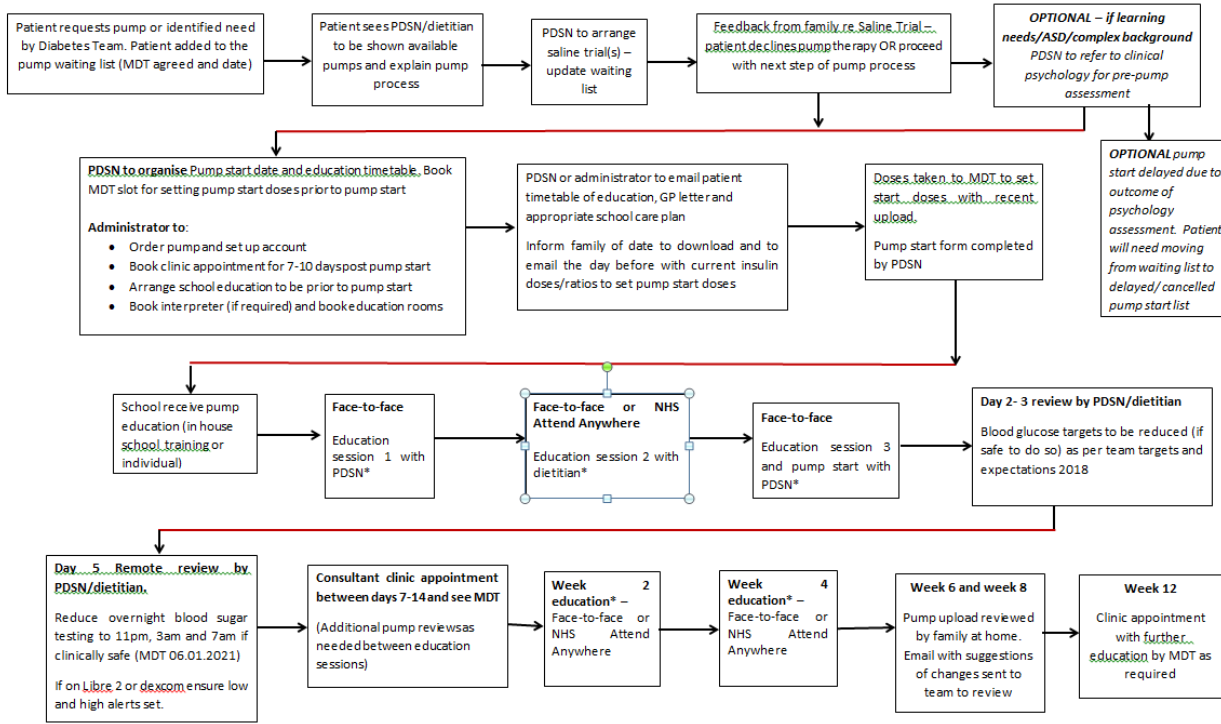
Pump start process

See appendix 1 for group pump start process and single patient start process

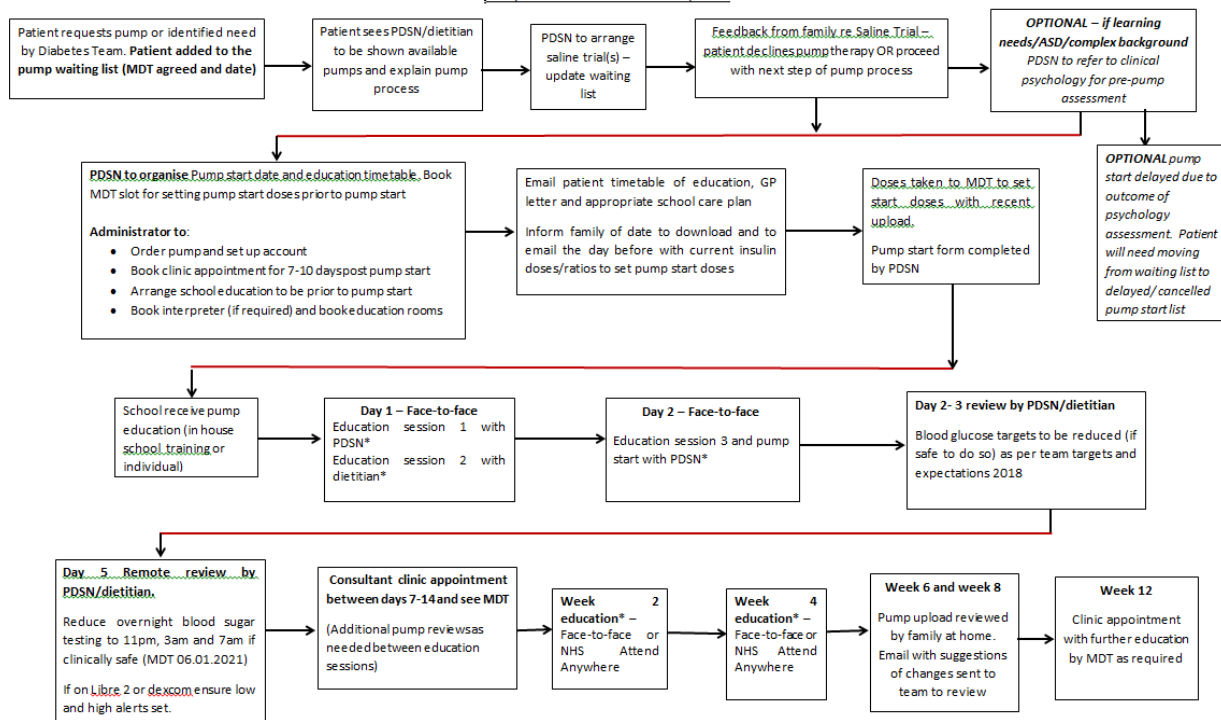
Key features of pump start process:

1. Pump start doses are agreed by MDT, taking into account current insulin doses and review of glucose data eg on CGM. See appendix 3 for proforma to be completed
2. Structured education will be delivered by the MDT before and after pump start in a step wise fashion (see appendix 2 for examples)
3. Depending on CYP pump starts may be delivered individually or in groups
4. Education staff (nursery/school/college) responsible for the CYP must receive education
5. All resources in appendices are available on the MDT shared drive

Pump Process Nov 2021 – Single patient



Pump Process Nov 2021 – Group starts



*For content of education please see relevant additional sheet

Appendix 2: examples of structured education for different insulin pumps

Education Sessions: Pre-Pump Start MEDTRONIC

Session 1: PDSN

- Differences between MDI & CSII therapy
- Paperwork – pump start folder
- Risks Of DKA
- Navigating the pump – menus
- Connecting Contour BG meter
- Basal rate programming and bolus insulin set up
- Set changes- Practical demonstration
- Emergency kit
- Family to take sets and saline for practice (single patient pump start)
- Instructions for reduction of basal insulin the day before pump start
- Set up [Carelink](#) account and obtain username/password
- Insurance: £3000 Pump contract and agreement completed

Session 2: Dietitian

- Programming of Bolus Wizard (if not already done)
- Adjust Bolus Wizard settings
- How to deliver and cancel a bolus
- Review of last bolus given
- Corrections (without food)
- Introduce function of advanced [bolusing](#), to be discussed further as appropriate
- Review diary (if applicable) and check ratios

Session 3: PDSN

- Hypoglycaemia – mild moderate and severe (including glucagon)
- Hyperglycaemia- high sugars & ketones
- Sick day rules
- If using [Libre 2](#) or [Dexcom](#) to set low and high alerts
- **PUMP START***

*An extra session may be needed for set change education/ practice

Education Sessions: Post-Pump Start MEDTRONIC

Day 2-3: Remote review

- Offer support with first set change
- Review pump upload. Aim to bring down blood glucose targets

Day 4-5 Remote review

- Reduce overnight BG testing to 11pm and 3am if clinically safe
- Start corrections at parents bedtime and overnight

Day 7-14: Face to face

- MDT clinic review

Week 2: PDSN. Face-to-face or NHS Attend Anywhere

- Introduction/share screen to review [Carelink](#) alongside [Libreview](#)/Clarity (if applicable)
- TIR, AGP, %CV etc. Introduction to recognising and making changes to the pump settings
- TBR Use- Programming & Exercise (Basic)
- Further reviews as required

Week 4: PDSN Face-to-face or NHS Attend Anywhere

- Continue with [Carelink](#) education alongside [Clarity](#)/[Libreview](#) education – review learning following week 2 education
- School Contact: Follow-up as required
- Additional reviews as required

Week 6 and 8: Remote. PDSN/Dietitian

- 2 x pump upload dates. Families to e-mail in suggestions of changes. Contact from team to discuss upload in depth
- Additional reviews as required

Week 12: MDT Clinic appointment.

- Further education available:
- Advanced [bolusing](#)
 - Basal rate testing
 - Exercise management
 - Holiday/airport information if applicable

Education Sessions: Pre-Pump Start OMNIPOD

Session 1: PDSN

- Differences between MDI & CSII therapy
- Paperwork – pump start folder
- Risks Of DKA
- Navigating the pump - menus
- Basal rate programming and bolus insulin set-up
- Pod Changes - Practical demonstration
- Emergency kit
- Support setting up [Diasend](#) account if patient does not have one
- Family to take home pod and saline to practice(single patient pump start)
- Instructions for reduction of basal insulin the day before pump start
- Insurance £250 Pump contract and agreement

Session 2: Dietitian

- Adjust Bolus Calculator settings
- Programming of Bolus Calculator (if not already done)
- How to deliver and cancel a bolus
- Review of last bolus given
- Corrections (without food)
- Introduce function of advanced [bolusing](#), to be discussed further as appropriate
- Review diary (if applicable) and check ratios

Session 3: PDSN

- Hypoglycaemia – mild moderate and severe (including glucagon)
- Hyperglycaemia- high sugars & ketones
- Sick day rules
- If using [Libre 2](#) or [Dexcom](#) to set low and high alerts
- **PUMP START**

Education Sessions: Post-Pump Start OMNIPOD

Day 2-3: Remote review

- Offer support with first pod change
- Review pump upload. Aim to bring down blood glucose targets

Day 5-6: Remote review

- Reduce overnight BG testing to 11pm and 3am if clinically safe
- Start corrections at parents bedtime and overnight

Day 7-14: Face-to-face

- MDT Clinic review

Week 2: PDSN. Face-to-face or NHS Attend Anywhere

- Introduction/share screen to review [Diasend](#) alongside [Libreview](#)/Clarity (if applicable)
- TIR, AGP, %CV etc. Introduction to recognising and making changes to the pump settings
- TBR Use- Programming & Exercise (Basic)
- Extended [bolusing](#)
- Further reviews as required

Week 4: PDSN Face-to-face or NHS Attend Anywhere

- Continue with [Diasend](#) alongside [Clarity](#)/[Libreview](#) education – review learning following week 2 education
- School Contact: Follow-up as required
- Additional reviews as required

Week 6 and 8: Remote. PDSN/Dietitian

- 2 x pump upload dates. Families to e-mail in suggestions of changes. Contact from team to discuss upload in depth
- Additional reviews as required

Week 12: MDT Clinic appointment.

- Further education available:
- Advanced [bolusing](#)
 - Basal rate testing
 - Exercise management
 - Holiday/airport information if applicable

Appendix 3 Proforma for pump start dose calculation

Patient Name: _____ Hospital Number: _____
 Age: _____
 Weight: _____ Date of last weight: _____
 Current doses:
~~Novorapid~~ Breakfast: ~~Novorapid~~ Lunch: ~~Novorapid~~ Tea: Glargine/Detemir dose: _____
 Current Total Daily Dose: _____

Patient name
 Patient hospital number
 Calculation using current basal
 Current basal:

When commencing pump therapy, the initial basal rates will depend on:

- Current insulin requirements
- Current HbA1C
- Duration of diabetes

For the vast majority the best method to calculate basal rates is from current basal insulin dose.

Exceptions to this are:

- Newly diagnosed
- Unsure of accuracy of current doses
- Recurrent DKA
- Unexpected current TDD very high

In these patients the weight method may be preferable

Total daily dose in units would be 0.5-0.8% of weight in KG.

Current basal dose

1. Review latest blood sugar data eg Diasend, Clarity, Libre view and HbA1c
2. Decide how much to reduce basal dose by eg 10-20%
3. Allocate different basal rate for different times of day depending on age

Circle which reduction used
 10% reduction 20% reduction:
 24 hour flat rate:
 0-6 years

Time slot	Actual basal	Total	Pump basal	Total
00:00 (100%)		(3hrs)		
03:00 (100%)		(5 hrs)		
08:00 (80%)		(4hrs)		
12:00 (100%)		(4hrs)		
16:00 (100%)		(4hrs)		
20:00 (120%)		(4hrs)		
24 hour total				

ISF: (100/pump total daily dose)

AII:

Ratio: Breakfast: Lunch: Tea:

References (including any links to NICE Guidance etc.)

NICE 'Diabetes (type 1 and type 2) in children and young people: diagnosis and management' NICE Guideline (NG18)

Documentation Controls (these go at the end of the document but before any appendices)

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	V007	July 2025	Dr J Smith	Joint guideline required	
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