

Who is suitable for CSII, Why and How to Access Pump Therapy

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What is CSII?

- Insulin pump therapy or Continuous Subcutaneous Insulin Infusion first developed at Guys Hospital London and Yale University USA IN 1978/79. Originally developed as delivery of parathyroid hormone but quickly utilized for insulin delivery.
- Little used in UK initially but developed in USA and mainland Europe. Estimated pump use is 20% in USA, 15% in Germany and 8% in France.



What is CSII?

- Used for subcutaneous delivery of rapid acting insulin, so usually uses either Novorapid, Humalog or Apidra insulins.
- Can be used to deliver Actrapid or Humulin S.
- A few patients use hypurin porcine neutral insulin.
- Rapid acting analogues best because have more physiological profile.

What is CSII?

- Advantages of only rapid acting insulin?
- Matching insulin to Carbohydrates as closely as possible.
- Predictability of insulin profile, for meals, snacks and correction doses.
- Delivered continuously as background provides stable insulin which can be varied hour by hour to match diurnal rhythm.
- Reduction in overall insulin dose.

What is CSII?

- Disadvantages of rapid acting insulin alone?
- Any interruption or blockage in cannula results in no insulin cover within 4 hours, and therefore increased theoretical risk of DKA
- Need to be attached to pump 24 hours per day.
- Necessary to have ability to troubleshoot potential problems and carry spare kit around in case of problem.
- Need to do fingerstick tests at least four times daily.

Who is suitable for CSII?

- In UK NICE approved treatment. Initial Guidance in 2003 (Technology Appraisal No 57) and updated in 2008 (TA Guidance No 151) www.nice.org.uk/TA151
- Approved for use in Type 1 DM. Not approved for Type 2 DM.
- Must be on Multiple insulin doses including Glargine or Detemir
- HbA1c > 8.5% (69 mmol/Mol) or above despite best efforts to improve. Can be lower but with disabling hypoglycaemia or hypoglycaemia unawareness.

Who is suitable for CSII?

- Planning pregnancy and unable to improve control.
- Special situations – gastroparesis, peripheral neuropathy.
- Should be offered for children <12 years of age. May need to be offered trial of MDI when older teens.

Possible benefits for pump user

- Better metabolic control
- Improved quality of life – improved accuracy and control
- Improved flexibility around mealtimes and sleeping
- Reduction in hypoglycaemia and improved hypo awareness
- Lower glucose excursions
- Lower anxiety and depression scores
- Reduction in hospital admissions as a result of DKA and hypoglycaemia. ??reduction in hospital appointments

Possible benefits for Commissioning Groups

- NICE Guidance and NSF objectives met
- Collaborative working with other Trusts
- Quality, Innovation, Prevention and Productivity (QIPP) Agenda met.
- Potential reduction in expensive long term complications of Diabetes (retinopathy and nephropathy)

Is anyone not suitable for CSII?

- ?Type 2 diabetes
- Needle phobic patients?
- Unwillingness to test blood glucose levels?
- Elderly or infirm patients (blind or manual dexterity problems) ?
- Inability to count carbohydrates?

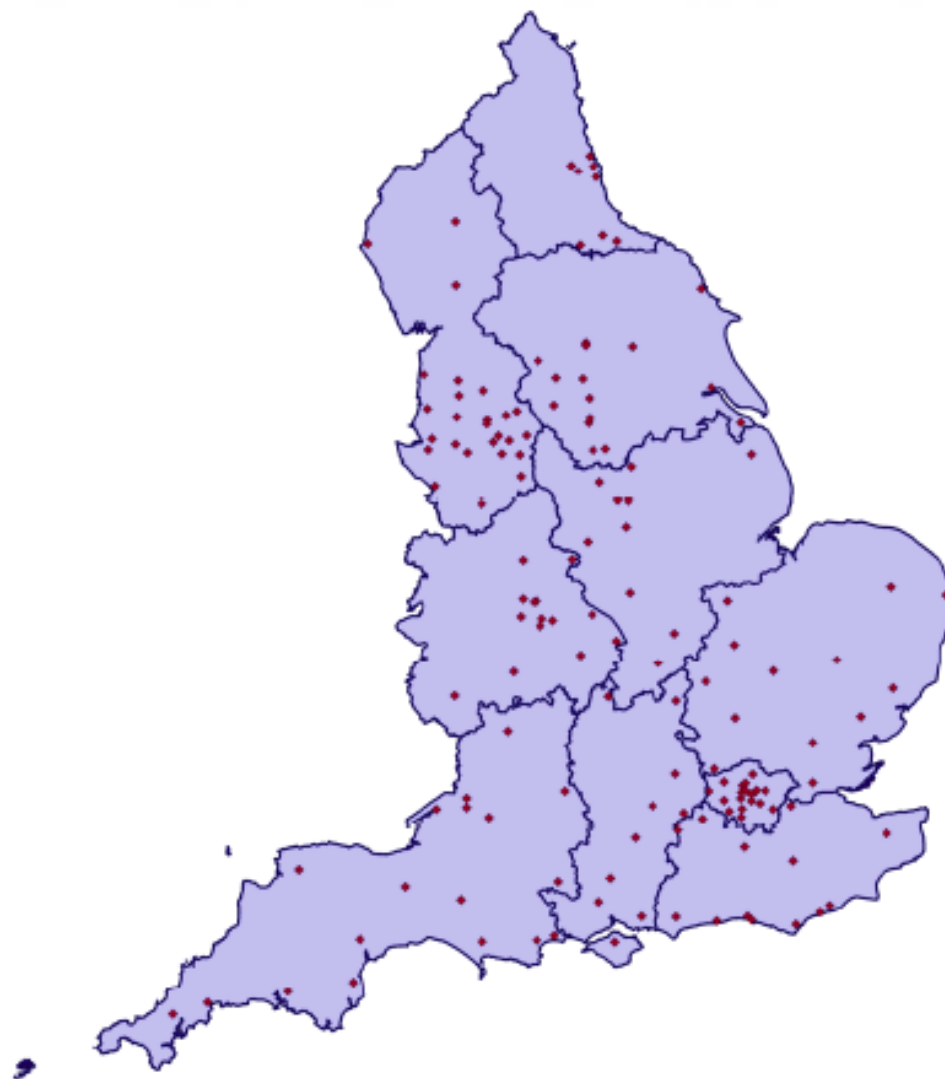
Pump provision in UK

- YHPHO conducted survey of provision of CSII services in England in 2009-10 and has data from 73 adult and 76 paediatric units.
www.yhpho.org.uk/resources/item.aspx?RID=92318
- Approx 8% of children and 2% adults thought to be pump users
- Majority of units had <40 individuals on CSII.

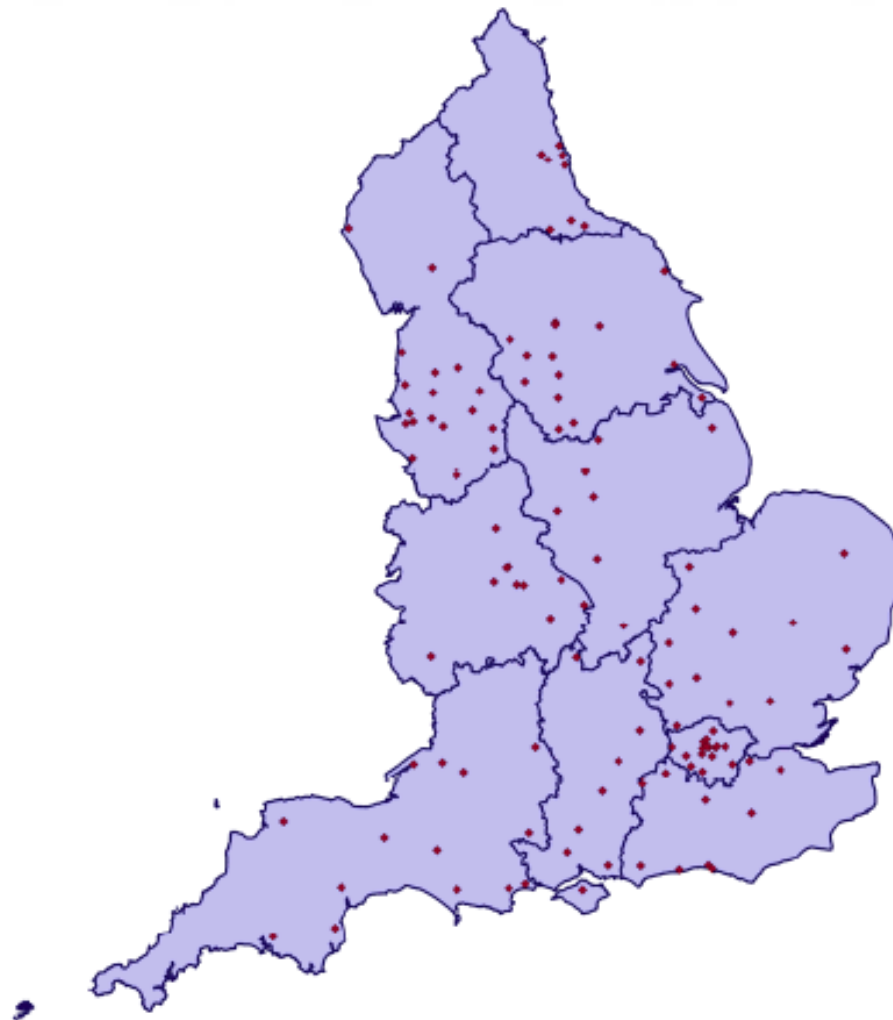
Pump provision in UK

- 42% of units <20 patients.
- 10% of units had >80 patients
- Majority had been on pump for < 2 years.
- Most common reason for starting CSII was glucose instability

Location of units providing insulin pump care for adults



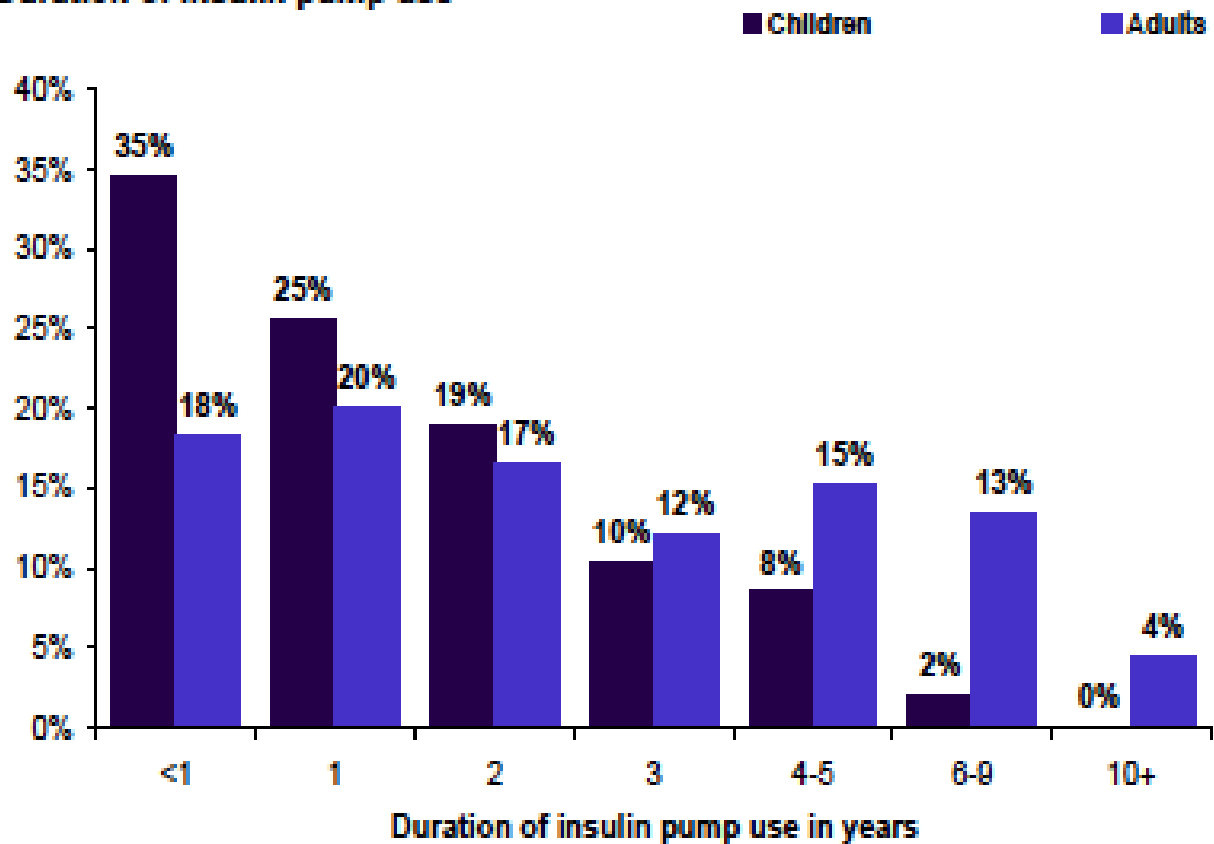
Location of units providing insulin pump care for children



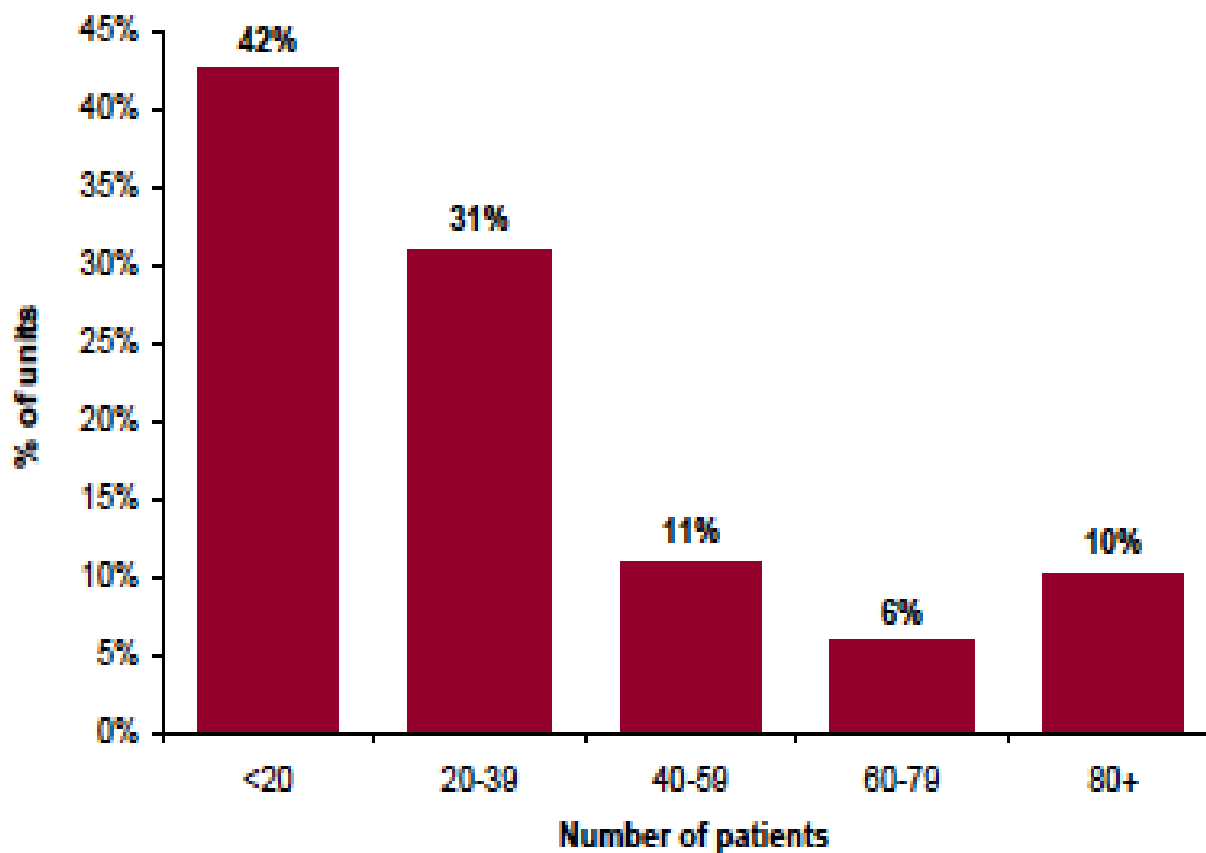
Contains Ordnance Survey data
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Produced by YPHO 2010

Duration of insulin pump use



Number of patients per unit



Pump provision in UK

- In Scotland pump provision varies from <1% Type 1 patients in Arran and Ayrshire to around 6% in Fife.

www.diabetesinscotland.org.uk/Publications/SDS%202010.pdf

- NICE benchmark of 12 % Type 1(with 50% children <12 years and 15%> 12 years) not likely to be met.

Pump provision in the UK

- Pump industry estimates there to be around 12,000 insulin pump users in UK and Republic of Ireland in 2010 – with around 3250 patients beginning CSII in 2010.
- Around half of these new starts supported by industry as DSN numbers diminish.
- Patient surveys suggest that CSII users need more ongoing support and education.

Modern pumps



Pump referral pathway

- Referrals taken from Primary Care, other Diabetes Team members, out of area hospitals
- Assessment by MDT in pump clinic (Diabetes Consultant, DSN, Diabetes dietician)
- Introduction to current pump users.
- Models of pumps shown and information given
- Assessment of CHO counting ability.

Pump referral pathway

- Referral to DAFNE or CHO counting course if appropriate
- Intensification of current insulin regimen
- Further endocrine assessment if necessary (synacthen test, anti-endomycial antibodies, cortisol levels)
- Referral for continuous glucose sensing.
- Other appropriate equipment

Starting insulin pump therapy

- Usually done as a group start with 4 patients plus a relative or friend (monthly start in our service) attending over 2 days from 9.00 -14.30 approx. Some Centres do saline trial first.
- Covers all the basics of pump therapy ;basal and bolus insulin ; hyper and hypoglycaemia; sick day rules; DKA prevention; skin sites and care; alcohol; exercise and holidays. Use of advanced features on pump; Insulin: CHO ratios

Starting insulin pump therapy

- Given all supplies to last for first few weeks.
- Emergency contact number (DSN usually) and technical helpline number for pump company given
- Emergency supplies discussed. Patient needs to continue small supply of in date long acting insulin in case of pump failure. Patient is taught how to convert back to pens if necessary. Ketone test sticks (NICE guidance)

Starting insulin pump therapy

- Daily or twice daily telephone contact.
- Patient seen 1-2 weeks later for follow up and then seen in the pump clinic which is run weekly in our Unit.
- Pump clinic incorporates ongoing structured education for patients and provides forum for pump users to meet each other. Clinic also provides training for SPRs and diabetes team.

Starting pump therapy

- Reservoirs, cannulas, batteries and replacement battery caps all supplied by pump manufacturers directly to patient on regular standing orders. Bills scrutinized by Diabetes manager prior to forwarding on to PCT.
- NICE agreement suggests pump warranty lasts for 4 years and then providing patient complying with treatment new pump can be supplied.

Starting pump therapy

- NHS asks that patient insures pump on household insurance policy or by using specialist insurance company. This is patient responsibility to cover accidental damage.
www.insuranceforpumps.co.uk
- Manufacturer will replace damaged pump via courier within 24 hours if possible.
- With insurance pump user is able to borrow loan pump for backup for holiday use.

Ongoing pump therapy

- Pump Unit can provide holiday letter for pump user to show at airports.
- Responsibility of patient to ensure they keep supply of emergency insulin in case of pump failure.
- Patient receives ongoing pump support from clinical team.

- Patient should have supply of glucose test strips and is recommended to perform around 6 tests each day.
- NICE suggests blood ketone test sticks for emergency use. Glucagon also recommended.
- Some patients prone to Staph skin infections may benefit from keeping course of flucloxacillin in case of cannula infection.

Ongoing pump therapy

- NICE asks for either improvement in HbA1c or improvement in Quality of Life scores or reduction in hypoglycaemia rates or hospital admissions.
- Pump Units need to undertake Audit of pump service to ensure improvement is occurring in pump cohort.
- Some patients will convert back to MDI if they are unable to manage CSII.