

Continuous subcutaneous insulin infusion: The successful transfer of a pump service to a community diabetes team

Nicola Allen, Alan Choo-Kang, Sharon Shelley, Julie Taplin

This article describes the transfer of a continuous subcutaneous insulin infusion (CSII) service from a small secondary care team to a larger community-based team. The changeover allowed people to be reassessed and re-educated on the use of their pump. It also allowed for more effective identification of suitable candidates for pump therapy and an education programme to be set up for new and old users. Since the move, there has been an increase in people using CSII therapy. There has also been a reduction in hypoglycaemic events and an overall reduction in HbA_{1c} levels among the group of new pump users. The new service offers people more contact with the team and people using a pump are also required to sign a contract to acknowledge what is expected of them when they commence pump therapy.

Continuous subcutaneous insulin infusion (CSII) is recommended for individuals with type 1 diabetes who are unable to control their diabetes using multiple daily injections (MDI), despite optimised intervention. The two key criteria are:

- Frequent disabling/severe hypoglycaemia and/or unawareness of hypoglycaemia.
- Failure to achieve HbA_{1c} levels below 69 mmol/mol with optimised MDI.

NICE (2008a) has suggested that 12% of people with type 1 diabetes should be using CSII therapy. However, a report entitled *Pump Action – A Review of Insulin Pump Uptake and NICE Guidance in English PCTs* (The Medical Technology Group et al, 2010) has identified that only 3.9% of people with type 1 diabetes in England are actually using CSII therapy.

CSII specialist teams in South West Essex

NICE (2008a) recommends that CSII initiation, education and management are performed only

by a trained specialist team. Ideally this team should include a physician with a specialist interest in insulin pump therapy, a DSN and a dietitian. Historically, these teams have been almost exclusively the domain of secondary care under the acute hospital. Before 2011, CSII therapy in South West Essex Primary Care Trust (PCT) was initiated and managed by a small team (one DSN and a diabetologist) at Basildon and Thurrock University Hospitals NHS Foundation Trust. NICE guidelines (2003; 2008a) were not fully met due to the size of the team and their inability to provide structured education programmes (such as dose adjustment for normal eating – DAFNE). This may partly explain why only 1.1% of an estimated 2000 people with type 1 diabetes, who were under the secondary care team in South West Essex PCT, were using CSII therapy.

Changing the provider of South West Essex diabetes service

In April 2011, the CSII pump service was

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Article points

1. NICE has recommended that 12% of people with type 1 diabetes should be using continuous subcutaneous insulin infusion. In reality this figure is much lower.
2. A change of team from secondary care to the community allowed a reassessment and re-education of existing CSII users in a South West Essex Trust.
3. The new team increased the number of people using CSII therapy in the area.
4. An improved education programme helped to improve outcomes such as lower HbA_{1c} levels and fewer hypoglycaemic events.

Key words

- Community diabetes care
- Continuous subcutaneous insulin infusion
- Education programmes
- Pump therapy

Authors

Authors' details can be found at the end of the article

Page points

1. The community CSII team is made up of four DSNs and one dietitian, who provides one half-day clinic a week and one MDT per month. In addition, a diabetologist, who has expertise in pump therapy holds two half-day clinics per month.
2. In 2011, 27 people who were using CSII were transferred from the acute hospital to the community service. Each person was invited to attend an appointment at the new community-based service and their CSII usage was reviewed.

transferred to a community provider, along with all outpatient diabetes care, excluding maternity and renal services. This was in line with the white paper *Transforming Community Services* (Department of Health, 2009).

The rationale for this move to the community was a recognition that the previous service provided from the acute trust was not optimal and not fully meeting recommendations from NICE; this was mainly due to resource implications, as well as some organisational difficulties. The aim was to ensure the quality of care and that the service available would be improved.

The community CSII team is made up of four DSNs and one dietitian, who provides one half-day clinic a week and one multidisciplinary meeting per month. In addition, a diabetologist, who has expertise in pump therapy, holds two half-day clinics per month.

Initially, there were some concerns about transferring the CSII service to the community; these were centred on governance and expertise, together with limited examples of successful CSII services delivered by community DSNs. However, the specialist nursing resource

available in the community team has been invaluable. Furthermore, the community team is managed as a completely separate team and does not have to make compromises based on acute hospital commitments.

Transferring existing CSII users to the community service

In 2011, 27 people who were using CSII were transferred from the acute hospital to the community service. This included two people with type 2 diabetes who had started using a pump before the relevant NICE guidance had been published (NICE, 2008a).

Computerised medical records were not available so the nurse consultant met with the diabetologist to review all of the medical records before the individuals attended any clinics. Each person was invited to attend an appointment at the new community-based service. Various aspects of their CSII usage were reviewed, including whether they were suitable for pump therapy, the education they had received in the past and their basic knowledge of how to use the pump. Glycaemic control, hypoglycaemic episodes and hypoglycaemic

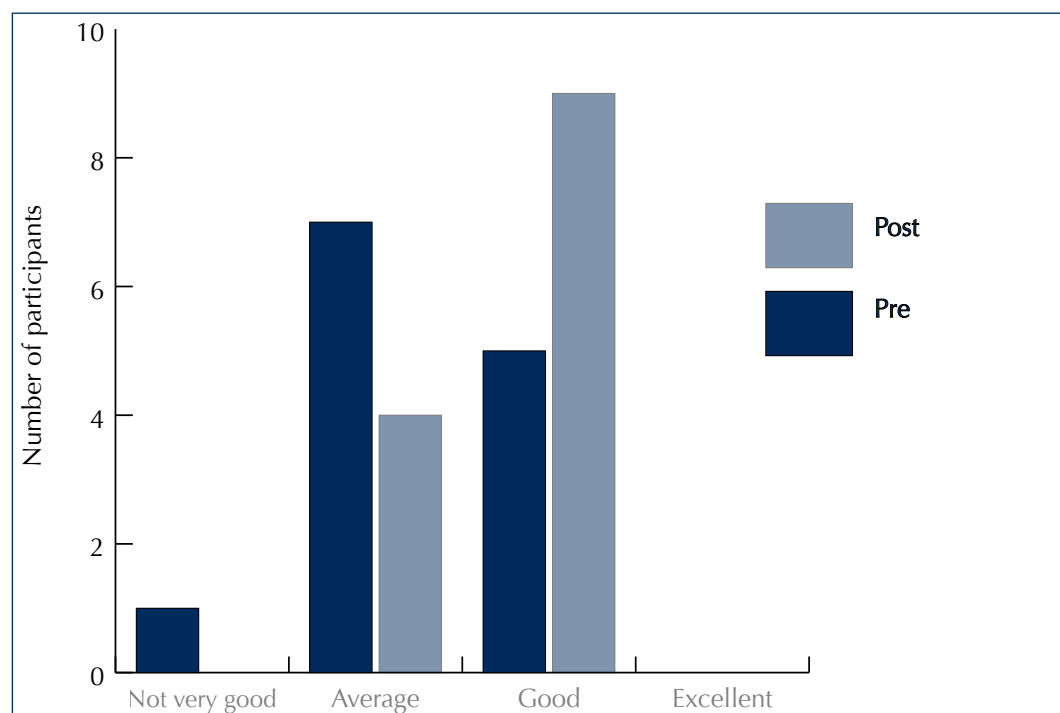


Figure 1. Change in reported understanding of the pump's functions.

awareness were recorded along with any admissions for diabetic ketoacidosis (DKA).

These initial data were collected to form the baseline information for an audit and to identify areas that needed development. One of the main findings was that only four of the 27 individuals had received any training on carbohydrate counting or attended a structured education course such as DAFNE. It was identified that accurate carbohydrate counting was either not being used or was being applied inaccurately or inconsistently.

The results 18 months on

CSII therapy use has increased from 1.1% to 2.9% ($n=50$) of the estimated population of people with type 1 diabetes. CSII therapy has been initiated in 21 people since the service has been moved. People with diabetes were selected for CSII therapy based on clinical need and NICE selection criteria; this included failure to achieve sufficiently good glycaemic control and significant problems with hypoglycaemia. A small proportion of people were selected for other reasons, such as need to achieve better diabetic control urgently during pregnancy, or significant “dawn phenomenon” leading to poor control. The service’s protocol is that people either attend DAFNE, or our shortened carbohydrate counting and insulin dose adjustment programmes, before they start using CSII (Allen and Taplin, 2013).

Education

Education sessions were developed for the 27 people who transferred over to the new service. The education programme consists of a 4-hour session, combining a mixture of informal education and a chance to share ideas. This session is held every six months and is designed to respond to needs and requests of pump users.

The first meeting, which was split over two dates in June and July 2011, was attended by 18 of the 27 CSII users. The focus of the session was about improving knowledge of the pump functions. *Figure 1* shows responses from the participants, both before and after the session, when asked about their understanding of pump functions, including the bolus features. The second session in May 2012 concentrated on how to test basal rates, as well as sick day rules and how to deal with being unwell. The most recent session was held in November 2012 and the focus of this group was how to download and interpret the data from their pump and meters; 19 of the 50 pump users attended.

The feedback has been positive and the groups are happy to make suggestions about future sessions. The next education day will focus on managing a pump while in hospital.

“The experience of transferring and developing a CSII service using a new provider in the community has brought some challenges.”

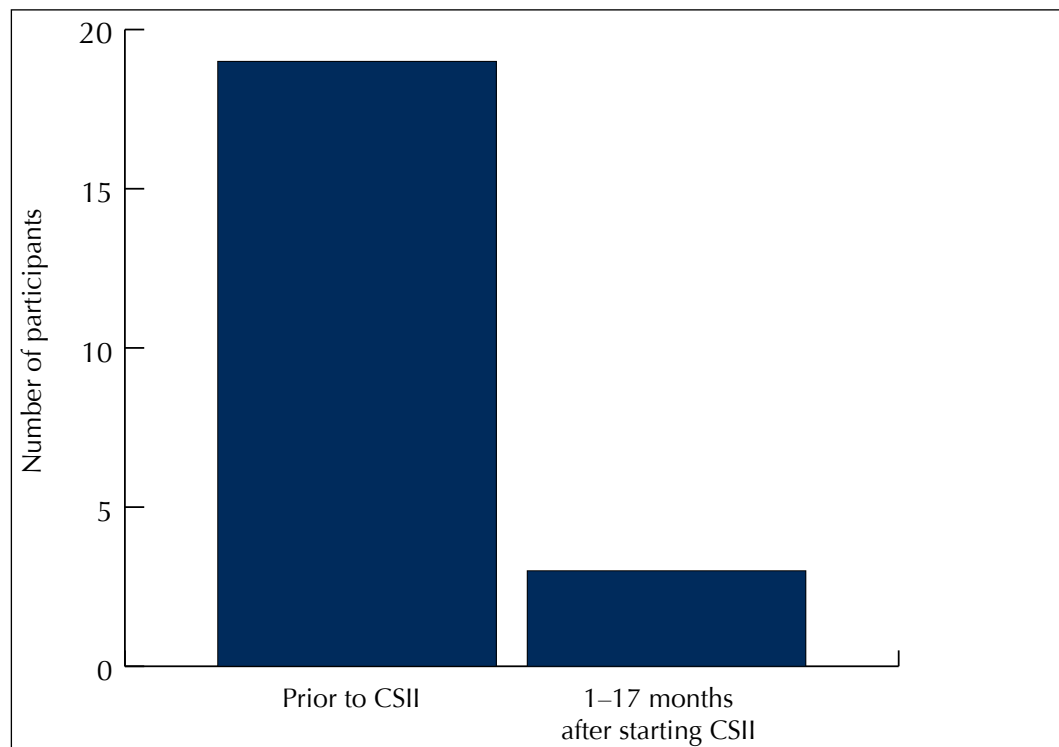


Figure 2. Reduction in self-reported severe hypoglycaemic events before and after starting CSII therapy

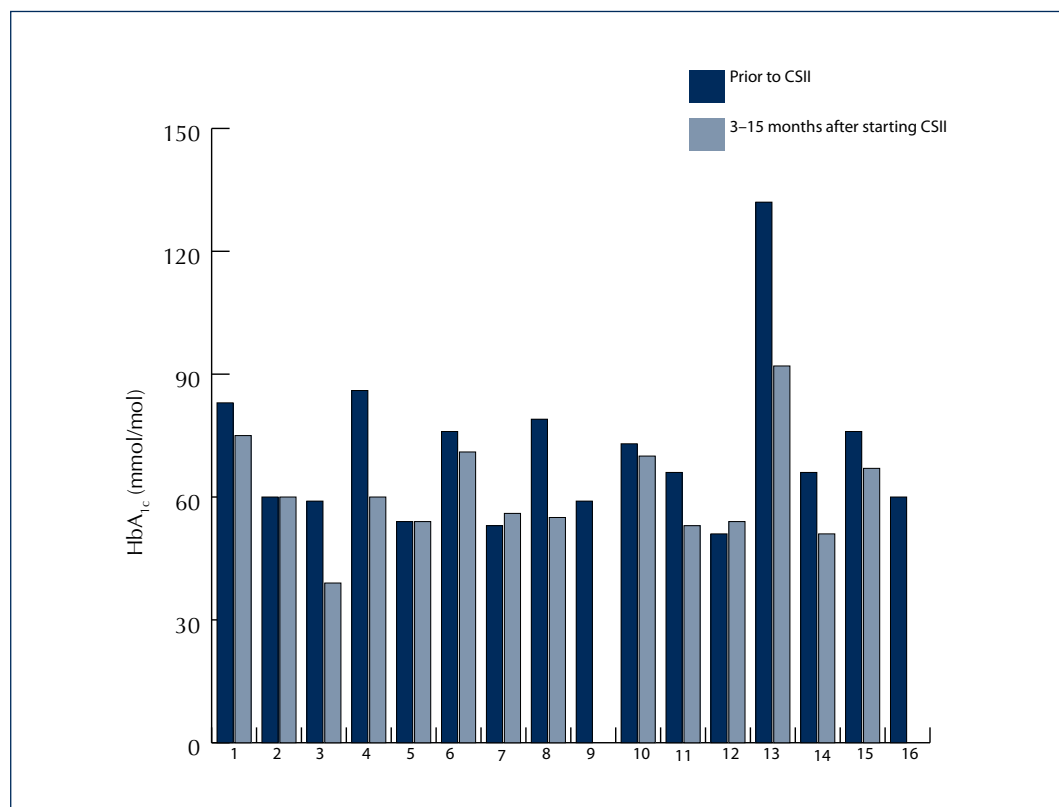


Figure 3. Changes in HbA_{1c} for people started on CSII therapy between July 2011 and October 2012

Initiating new pump users

Twenty-one people were started on CSII therapy with the new community team between July 2011 and October 2012. Each individual was assessed using the locally developed pump pathway. They have also all attended a structured education programme (DAFNE; www.dafne.uk.com).

When each person begins CSII treatment, targets are negotiated and contracts are signed by both the person with diabetes and the team. The contract sets out the responsibilities of both the individual and the team and details the goals to be achieved for continuing CSII therapy. These goals are reviewed regularly at appointments. Contracts are renewed every six months when it is necessary to apply to the local clinical commissioning group for the continuation of CSII therapy.

Five of the 21 new pump users have only just started CSII therapy at the time of writing this article, so the results for pre- and post CSII therapy reported below are for 16 people only. The range of time between collection of the pre- and post data was 2–17 months. Significant improvements have been shown. In the year before starting pump therapy, there were four hospital admissions with DKA and since starting CSII this has reduced to one. *Figure 2* shows that the number of occurrences of severe hypoglycaemia (defined as needing third party assistance) has also reduced. There were 19 self-reported episodes of severe hypoglycaemia in the year before starting CSII therapy and this has reduced to four since initiation of the new service.

Change in HbA_{1c} has been reported for those on CSII therapy for longer than 3 months ($n=16$). The mean HbA_{1c} value before CSII therapy was 72 mmol/mol (8.7%) and this was reduced to a mean of 61 mmol/mol (7.7%) after CSII therapy was initiated. This is comparable to the levels recommended in the NICE (2008b) final appraisal determination. *Figure 3* shows the individual changes in HbA_{1c} for the 16 people who began pump therapy between July 2011 and October 2012. Ten of the 16 people had a reduction in their HbA_{1c} value. Although two people had an increase and two had no change, we were not surprised to see this result; these four individuals were all started on CSII therapy due to the number of severe hypoglycaemic events they had rather than to reduce their HbA_{1c}. Data were missing for two people at the time of writing.

Summary

The experience of transferring and developing a CSII service using a new provider in the community has brought some challenges. It was thought that not having access to hospital notes for the pump users

Page points

1. The new community-based service benefitted from greater DSN availability and input from a dietitian; this was not the case in the previous acute service
2. It is important to note that the service transfer has not been a complete success, as several of the individuals transferred, as well as some of the new pump users, still have poor diabetes control despite using the pump therapy.
3. One advantage of the community pump service has been that the relationship between the team and people with diabetes has been well established before initiating pump therapy through on-going diabetes care and attending structured education.

would be a disadvantage but this gave the new team an opportunity to take an unbiased and thorough medical and social history from each individual.

It is felt that a large part of the success is due to the new service having much greater DSN availability and input from a dietitian; this was not the case in the previous acute service. Further evaluation of the education days suggests that this service has been greatly appreciated by the pump users. The most significant benefit of the new service was the improvements in the education provided, both pre- and post pump initiation, and this was made possible by the increase in staff levels and DSN support.

It is important to note that the service transfer has not been a complete success, as several of the individuals transferred, as well as some of the new pump users, still have poor diabetes control despite using the pump therapy. Anecdotally, some of these individuals have reported struggling to adapt to the greater involvement of the healthcare professionals in the community team. Attending appointments more regularly, testing blood glucose levels more frequently and accurate carbohydrate counting have proved challenging for some. This highlights the need to select individuals who will be able to cope with the demands of the community team. For those individuals that are not able to cope, they will be put back on to MDI.

A few of the individuals have been taken off CSII therapy due to non-compliance with the team's requests. This has mostly involved people who started their therapy under the acute team when the pump pathway and contracts were not in place. The community team hope that the use of contracts, setting and reviewing goals and being clear about expectations with all new those using CSII therapy will end the need to discontinue the therapy for anyone who starts the programme.

There have been many advantages of the community pump service. One advantage has been that the relationship between the team and people with diabetes has been well established before initiating pump therapy through

on-going diabetes care and attending structured education. This contact has been important in identifying people who are suitable for CSII therapy and for the continuity of care.

Having the CSII service in a community setting has proven to be a worthwhile and satisfying extension of the role of the community DSN, dietitian and diabetologist. Feedback from pump users demonstrates that they appreciate the additional support they have been given; this is reflected in the outcome data and the good attendance at the education days.

Overall, it was felt that the transfer of the CSII service from acute to community service provider has been beneficial to all people using CSII therapy. ■

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