

Implementation of hybrid closed loop therapy in the NHS: experiences from the adult diabetes centre in Derby and Burton

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Br J Diabetes 2024;**24**(2):127-129
<https://doi.org/10.15277/bjd.2024.462>

Key words: hybrid closed loop, implementation, NHS, type 1 diabetes

Introduction

Over the last few decades evidence has accumulated to support the role of hybrid closed loop (HCL) therapy in the management of people living with type 1 diabetes (T1DM). Randomised controlled trial evidence has demonstrated improvements in HbA_{1c}, hypoglycaemia and psychological outcomes.^{1,2} The NHS England HCL pilot demonstrated that rollout in the NHS was not only possible but was also associated with marked improvements in HbA_{1c} and diabetes-related distress.³

December 2023 marked a watershed moment in the care of people living with T1DM (PwT1D) in England. The National Institute for Health and Care Excellence (NICE), having reviewed the available evidence, published technology appraisal (TA) 943 for the use of HCL systems in the management of T1DM. The guidance recommends HCL systems as an option for managing blood glucose levels in: 1) children and young people with T1DM; 2) people with T1DM who are pregnant or planning pregnancy; and 3) adults with T1DM who have HbA_{1c} \geq 58 mmol/mol (7.5%) or disabling hypoglycaemia (when hypoglycaemia occurs frequently or without warning, so the person is constantly anxious about having hypoglycaemic episodes), despite best possible management with at least one of the following: continuous subcutaneous insulin infusion (CSII), also known as insulin pump, real-time continuous glucose monitoring (CGM) or intermittently scanned CGM.⁴ NICE TAs normally mandate relevant health bodies to comply with the recommendations and make the health technology available for people living with diabetes very soon after the publication of final guidance.

However, given the complexity of delivering HCL at scale, NICE agreed to a 5-year implementation period to allow the NHS time to build competencies within the clinical workforce, and to secure cost-effective HCL therapies.

Key elements of the HCL implementation include but are not limited to the capacity and competencies of healthcare professionals (HCPs), training and education of HCPs and people living with diabetes, commercial requirements and resources to support mobilisation, integrated care board (ICB) reimbursements plus outcome reporting and auditing. The identification and prioritisation of PwT1D who are likely to benefit most from HCL therapies is also of paramount importance. To address all these points, a 5-year implementation strategy has been designed to ensure that eligible people living with diabetes in England receive equitable access to HCL systems.⁵ This editorial aims to provide an update on the implementation of HCL systems based on the authors' clinical experiences from the adult diabetes service in Derby and Burton.

Prioritisation

According to the 5-year implementation strategy, "HCL should be initially rolled out to people living with T1DM where the need is greatest and to those who are likely to benefit most".⁵ NHS England have identified children and young adults, those who are pregnant or planning pregnancy and those already on an insulin pump as the key priority groups for early adoption of HCL. Different diabetes services may choose to follow different approaches to provide eligible people with T1DM with these technologies, based on the confidence, experience and capacity of the service in initiating HCL and supporting closed-loop users. For instance, some services might opt to prioritise people with high HbA_{1c} irrespective of the type of previous insulin therapy while others might choose to start with those established on an insulin pump. Other important aspects to take into consideration when prioritising those who are eligible and willing to start HCL are the level of HbA_{1c}, severe hypoglycaemia, impaired awareness of hypoglycaemia or disabling hypoglycaemia, retinopathy status, recurrence of diabetic ketoacidosis and diabetes-related burden.

Locally we have set up a System One template for referral for those eligible for HCL. System One is an electronic health record system that allows HCPs to securely record and manage patient information digitally. It is used in various healthcare settings, including primary care and hospitals, making it easier for different

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healthcare providers to collaborate on patient care. The clinician reports key data on eligibility for HCL and identifies the category of prioritisation. They send a task to the pump administrator who then brings the cases to the pump MDT for discussion, ensuring that those in Category 1 (top priority) are discussed and approved first.

Pregnancy

A key group for prioritisation for HCL are those who are pregnant. We have a dedicated preconception service and will fast-track anyone planning pregnancy for a pregnancy-specific HCL system (currently CamAPS FX). For those who present to the antenatal clinic with an unplanned pregnancy, we offer HCL to all women with T1DM at the first appointment. If they have uncertainties, they have the option to reflect and rediscuss as they move through early pregnancy. If the woman is agreeable to moving to HCL, she is invited to attend a pre-HCL education session with a diabetes specialist nurse. We employed a Band 4 pump administrator to support rollout, and we now have processes in place to ensure the HCL start occurs within four weeks of referral for HCL in pregnancy. As a result of the early adoption of HCL in our service, two thirds of our pregnant women with T1DM in Derby are achieving a third-trimester HbA_{1c} of less than 43 mmol/mol. Nine out of ten have a third-trimester HbA_{1c} below 48 mmol/mol. Our glycaemic outcomes in pregnancy have been transformed through the early implementation of the TA.

Education and training of HCPs and people living with diabetes

It is well accepted that the knowledge and confidence of HCPs around the use of HCL vary significantly across the country. Hence, education and training of both HCPs and PwT1D are a vital component in supporting wider access to HCL technologies.

In our service, we have run 'pumps and pizza' evenings where the wider team come together to learn about HCL systems. This includes hands-on experience and the opportunity to learn from the company representatives and more experienced members of the diabetes team. Data interpretation is another challenge, and the opportunity for less experienced members of the team to learn from those with more experience is paramount.

The Association of British Clinical Diabetologists (ABCD) and Diabetes Technology Network (DTN) UK have produced educational modules on HCL that introduce HCL and cover a wide range of relevant topics, including HCL essentials, HCL systems and exercise, and Top tips.⁶ Additional resources are also provided by the Diabetes Specialist Nurse Forum UK, including an informative comparison chart for the HCL systems.⁷ The Young Diabetologists' and Endocrinologists' Forum (YDEF), in collaboration with the DTN UK, run two technology courses annually aiming to enhance knowledge and confidence of Diabetes and Endocrinology trainees in the UK around several aspects related to diabetes technology, including HCL systems. HCPs could also benefit from other technology courses running

across the country (e.g. courses organised by the team of Leicester Diabetes Centre or King's Health Partners). Lastly, evidence from our clinical experience indicates that although the treatment of people using HCL technology sits within secondary care, primary care physicians are also involved in the care of closed-loop users. Hence, ensuring that primary HCPs have adequate knowledge to support the use of HCL systems in PwT1D is imperative.⁸

Creating capacity in your service

Many diabetes services across the country face clinical workforce capacity constraints. Similar experiences are observed in our clinical practice. In this context, ICBs and diabetes services are expected to develop a 5-year delivery plan and to set out how the needs of the local population that is eligible for HCL will be met. Our team have redirected time for follow-up diabetes clinics to time for staff to support the onboarding and early review of those making the transition to HCL.

Group starts of HCL have also been shown to be beneficial for both PwT1D and diabetes services. Our local experience indicates that large group starts of around 20 individuals per day are possible when supported by HCL company representatives and the diabetes team, with timely follow-up. This approach allows PwT1D to learn from each other and frees up clinical time within the service so that more HCL starts are performed. A key to the success of this approach is ensuring that there is adequate admin to support the set-up of the sessions and follow-up appointments and enough clinical capacity in the weeks after the start to allow for adequate follow-up.

Showcase events: supporting the choice of HCL systems for people living with T1DM

All commercially available systems are available for people living with diabetes to choose. The HCL system will be worn 24/7 by the person with diabetes so it is important to ensure that their choice closely matches their needs. To enable this, all PwT1D eligible for HCL should have access to information regarding all the different HCL therapies available before they choose a system which is tailored to their needs.

From our experience, showcase events involving HCPs, PwT1D and representatives from technology companies seem to be a great way of informing individuals on a wider scale and within a timely manner. At such events, HCPs can provide useful information and relevant resources about HCL and company representatives can demonstrate the different systems. As a result, PwT1D can raise any questions and have hands-on experience with all systems available before they make an informed decision about the HCL system that they prefer. Once the decision is made, PwT1D liaise with the diabetes service to make them aware of their preference so that an HCL start with appropriate follow-up can be arranged.

In Derby we have the well-established Derby type 1 diabetes Facebook Peer Support group which, with more than 900 members, has proven invaluable. For any individuals embarking on their initial journey with HCL who are uncertain about the

best choice of system for them, there is the opportunity to interact with existing users of HCL in the peer support group. This can provide them with additional details, the opportunity to pose specific questions and, most importantly, access to the experiences of those with lived experience to support optimal decision-making.

Data collection and auditing

It is crucial that the phased implementation of HCL is transparent and supported by data. Trusts must submit data through the National Diabetes Audit so that monitoring of uptake (and central reimbursement) is possible.⁵ Key metrics aim to capture and monitor HCL uptake, population outcomes and progress against addressing health inequalities.

Additionally, an ABCD closed-loop audit tool (<https://abcd.care/audit/abcd-closed-loop-audit>) has been developed and launched to coincide with the NICE TA 943 and broader access to HCL technology. Clinicians with users of closed-loop systems under their care are able to submit the data that they routinely collect as they monitor the progress of their patients to the national ABCD audit tool, which can also facilitate easy analysis of locally collected data by the local clinicians.

Data collection and auditing can be optimised by using the electronic healthcare systems available in the Trust. In our experience, designing templates within the existing electronic systems that are used in daily clinical practice can allow HCPs to collect all necessary information for monitoring and reporting purposes in a standardised way. This approach will facilitate the data auditing process in a timely manner and potentially free up time within the clinical and admin workforce of the service.

Conclusion

We are in a privileged position to be able to offer HCL widely to PwT1D meeting specific criteria. While implementation of the TA poses challenges for diabetes services and clinicians, overcoming these hurdles and delivering these technologies to improve the outcomes of the local T1DM population is extremely rewarding. As HCPs, we have an important role to support this implementation and to provide PwT1D with this life-changing technology.



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Conflict of interest ALL has received speaker fees and/or support to attend conferences from Dexcom and Novo Nordisk and research support from the Association of British Clinical Diabetologists. TSJC has received speaker fees and/or support to attend conferences from Eli Lilly, Novo Nordisk, Sanofi, Abbott Diabetes Care, Dexcom and Insulet. LL has no conflicts of interest. KLSK has no conflicts of interest. CK has no conflicts of interest. ER has no conflicts of interest. EGW has received personal fees from Abbott, AstraZeneca, Dexcom, Eli Lilly, Emecta, Insulet, Medtronic, Novo Nordisk, Roche, Sanofi, Sinocare, Ypsomed and research support from Abbott, Emecta, Insulet, Novo Nordisk, Sanofi.

Funding None.

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