

Digital solutions for personalised proactive care for patients with Type 2 Diabetes in primary care

A randomised control study to explore the impact and efficacy of the Healum Collaborative Care planning Software and App on condition management in the Type 2 Diabetes Mellitus Population in NHS Primary Care.

2021-2022



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Type 2 Diabetes in Primary Care

The increasing number of people living with long-term conditions (LTCs) is one of the biggest challenges facing our health and social care systems. In 2019, 463 million adults globally were living with diabetes, and this number is predicted to increase to 700 million by 2045 [1, 2], with Type 2 Diabetes (T2D) making up 90% of this population. This high prevalence results in Type T2D costing the NHS over £14bn per year[3] and patients with Type 2 Diabetes are estimated to account for 15-25% of all appointments at a local surgery level, depending on the practice.

The Opportunity

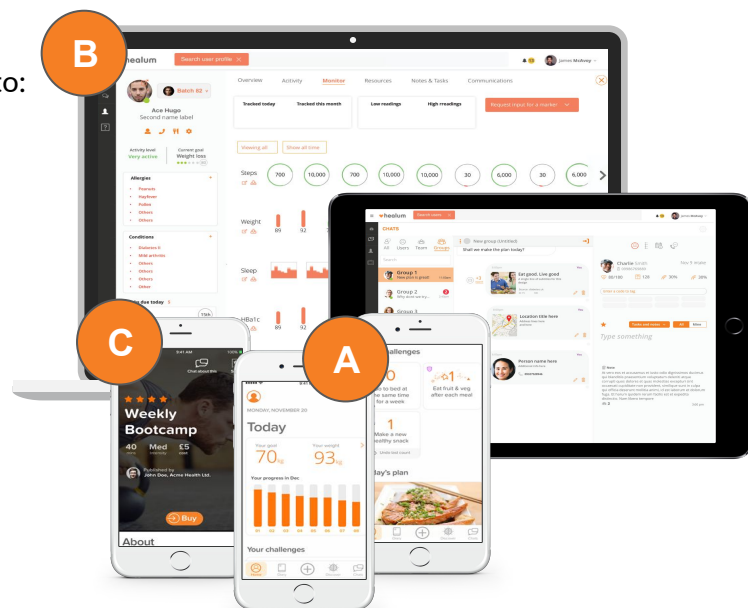
Healum previously identified challenges faced in primary care of high T2D prevalence, yet poor self-management due to a gap in self-management support provided by healthcare professionals (HCPs). To address this, a need was identified for a scalable way for multidisciplinary teams within primary care to provide relevant plans of care and support to patients. Healum worked with Vernova Healthcare to evaluate the Care Planning software and accompanying patient-facing app in a real-world randomised control trial to determine the impact on lifestyle, behavioural and health outcomes for patients living with T2D.

The Solution

The Healum solution has been designed to provide patients with co-created care and support plans to help them manage their LTC better, to ultimately improve health outcomes, access to care, and the efficiency of HCPs delivering care to patients with one or multiple LTCs. The software enables teams of HCPs within the NHS to provide personalised care as well as motivate, monitor and support patients in managing their health in a way that is personal to them at all the moments that matter in determining their health outcomes, whatever their cultural or socioeconomic background.

Diabetes nurses and doctors involved in the trial were able to:

- set goals and actions as part of a shared decision making process with each patient
- monitor patient progress and outcomes around the goals and intentions they had set
- share relevant resources and services that support patients to adopt healthy lifestyle choices
- automatically update patients with their most recent test results from EMIS



The Key Outcomes

Patients that used the Healum app reduced their HbA1c and BMI

The average percentage change in HbA1c for the treatment group over 6 months was -7.37% (\pm se 1.40%), but +1.75% (\pm se 2.05%) for the control group, and for BMI was -0.66% (\pm se 0.42%) for active treatment and -0.23% (\pm se 0.52%) for the control group. 72.41% of the active treatment group reduced their HbA1c, compared to just 41.54% of the control group. For BMI, 55.41% of the active treatment group had a reduction, compared to 50% for the control group.

72%



Reduced
HbA1c

Patients that used the Healum app saw an improvement in quality of life (QoL)

Patients with app access had improvements in both EQ5D5L and EQ VAS, two measures of self-rated QoL. Patients with a care plan and app had an average change in their pre- to post-trial EQ5D5L score of 0.0464, compared to -0.0086 for patients' without the app, and an average change in their pre- to post-trial EQ VAS score of 8.2%, compared to -2.8% for those without the app.

8.2%



Average
increase in
EQVAS

Patients had a better care experience from additional support through the app

The popularity and value of the app in providing support is shown by users completing 2,078 sessions, with 30% of users using the app at least 10 times and 84% at least twice in the first 30 days.

1,021



Actions
completed

Multidisciplinary teams were able to better motivate and educate patients

Across the 103 app users, 280 useful goals were agreed and shared in care plans, with a further 343 goals then joined in the app, such as "To be healthy enough to have a safe pregnancy". Resources were shared 5,396 times and viewed over 2,200 times, including "1-minute omelette".

2,284



Resource
views

Primary care staff were able to understand their patients' needs better

Actionable insights were generated from patient monitoring, involving 6,279 healthy choices and actions undertaken by app users (average of 61 per user), a combination of over 1,000 actions completed, 343 goals joined, over 2,400 trackers used and over 2,200 resource views.

280



Goals shared

Health inequalities were addressed through providing personalised care

The solution helps to address health inequalities by allowing staff to tailor the resources, goals and plans they share to each individual based on their socioeconomic or cultural backgrounds.

"I was never really told about the things I could do myself to help my diabetes management. However, during the care plan appointment and having the app I was informed about other things I could do. I feel that having the app there is a helpful reminder to do things myself to help my health." This has made me feel more motivated and supported.
(Patient with app access)



The Opportunity

Opportunities for Clinicians:

The increasing number of people living with long-term conditions (LTCs) is one of the biggest challenges facing our health and social care systems. In 2019, 463 million adults globally were living with diabetes, and this number is predicted to increase to 700 million by 2045 (1, 2), with Type 2 Diabetes (T2D) making up 90% of this population. This high prevalence results in Type T2D costing the NHS over £14bn per year(3) and patients with Type 2 Diabetes are estimated to account for 15-25% of all appointments at a local surgery level, depending on the practice.

1. Primary Care teams increasingly need to fulfil a signposting role putting patients in touch with information and resources to help self-manage their immediate and long-term healthcare needs.

The current sharing of information occurs on a fragmented and ad-hoc basis, typically sheets of paper and leaflets in a GP waiting room or consulting room. The time cost for GP's of gathering and sharing is 1-2 minutes per appointment, which if extrapolated nationally across the 340 million GP appointments across 8,000 surgeries, amounts to a net cost of 5.6-11.2 million hours, and total annual cost of between £280m-£560m (using a GP appointment cost of £50), not to mention the opportunity cost of poorer health outcomes resulting from the use of that foregone time.

2. Existing offline solutions and EHR software do not enable teams working in GP Practices to pull together all of the services, relevant information and educational support into a goal/habit-oriented personalised plan.

These plans of food, exercise, stress management, content, medication, monitoring and services should be available for each person to use to manage and monitor their Type 2 Diabetes or make the necessary changes to mitigate their risk of developing Type-2 Diabetes, in a way that a patient feels ownership of the plan or compelled to engage with it and where staff working in primary care are able to input in a viable way. Moreover, there is not even an effective way for practice nurses, HCAs, GPs and care navigators to aggregate and share the wide variety of information, services, content, apps and resources to patients as part of that plan. This leads to lower patient engagement, a higher level of unnecessary appointments, missed opportunities to refer patients to appropriate services and a higher cost burden for practices.



3. Primary-care service providers face significant IT, financial, logistical and cultural barriers to implementing personalised patient-centric care plans that are designed to support patients in their efforts to engage in self-care and behaviour change by addressing their capabilities, opportunities and motivation.

Integrated models of care that connect services across primary care, secondary care, social care and community services have a positive impact on health outcomes for people at risk of or with Type 2 Diabetes when included as part of a personalised and integrated plan of care, education, behaviour change and support.

All these challenges make it harder for these healthcare professionals to offer the highest quality of care to the patients who are attempting to manage their Type 2 Diabetes.

Opportunities for patients:

The patients that rely on the services from primary care to manage their Type 2 Diabetes experience a variety of challenges.

1. Currently patients often receive a lack of psychological support for the management of their Diabetes due to only seeing their health professional between every 6 months to a year.

People who get social support from friends and family, healthcare professionals and support organisations, such as the community-based and voluntary sector, are better able to manage their condition, more likely to make lifestyle changes and feel less distressed (3). People with Type 2 diabetes who get psychological support have also been shown to have better blood glucose control and less distress, than people who didn't receive any help (4).

2. Patients are informed they should make changes to their diet and do more physical activity but are not given sufficient support to make these changes.

Supporting people with Type 2 diabetes to make the changes they need to lose weight and do more physical activity has been found to result in fewer hospitalisations and lower use of diabetes medications (6). We know the most effective approaches target diet and exercise together, encourage people to seek support from their social support system and promote setting goals (7).



3. Patients struggle to build healthy habits and have to deal with multiple barriers and obstacles that prevent them making healthy decisions and remaining motivated.

Each person has their own personal struggles in their lives that can often act as a barrier when getting help, existing services for patients are not personalised or empathetic enough to help them understand exactly what approach would work best for them.

4. Patients are unaware of what services are available for them in the local community, which ones they are eligible for, and how they can access these services.

Even when an individual wants to make positive changes for their health, finding the right information can be a barrier to achieving this. For successful behaviour change an individual needs the capability and opportunity to engage and is motivated to enforce this particular behaviour more than others. Therefore, in order to give individuals the opportunity to change, they need to be provided with the right information to help them to do this.

These challenges make it harder for patients to manage their Type 2 Diabetes confidently and effectively and could have negative implications for their health.

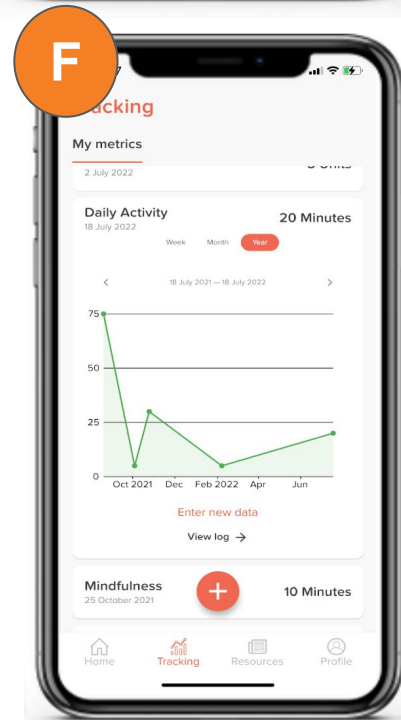
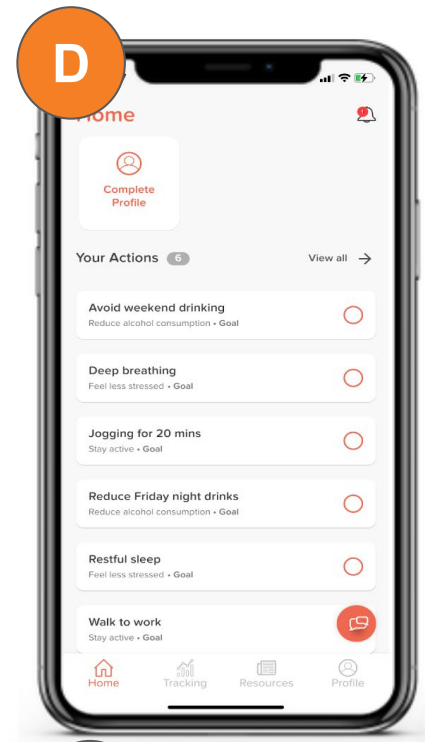


The Solution - Software & App

Healum's patient management platform and patient facing mobile app enables healthcare providers to deliver personalised care and support to patients to enable patients with one or more LTCs to proactively manage their health, understand their choices and take the actions they want.

The software and app aim to aid healthcare professionals and patients with the following:

- A) **Patient management** - by being able to view all patient insights, records, progress and care plans
- B) **Adherence programmes** - allows the creation of a behaviour change programme for each patient using goals, actions and obstacles
- C) **Medical Team management** - allows collaboration with other healthcare professionals in supporting care delivery
- D) **Personalised patient care plans** - allows the creation of care plans by multi disciplinary teams of clinicians and personalised to each patient
- E) **Patient personalised education** - using systems to create and share informative articles, videos, recipes and local services directly to each patient
- F) **Behaviour change support for patients** - systems to create goals, track different health metrics, create and tick off daily or weekly actions and address obstacles



The Outcomes

Outcomes for Primary Care team:

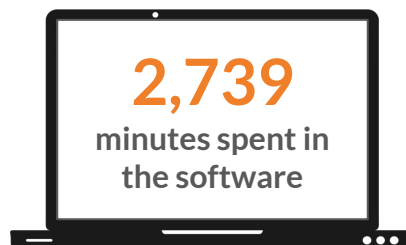
The Healum software helps healthcare professionals to provide high quality, personalised care for the active treatment group patients as part of the 'Digital Health Technology Catalyst' RCT.

The use of Healum's software and app as part of the trial has resulted in:

- Improvement in the **operational efficiency** of primary care. The Healum software empowers health care professionals to be able to put their patients in touch with a wide and more relevant set of information and resources. Thus increasing their capacity to deliver personalised care and support with tight time constraints.
- **Enhanced capability and capacity** of healthcare professionals to support and motivate patients to make healthier choices in their day to day lives. Improvements in the patient experience through combined use of the software and app to pull together services, information and educational support into a personalised care and support plan, which helps to shift the conversation between healthcare professionals and patients to encourage patient involvement in their care.
- **Addressing the health inequalities** amongst the population of Type 2 Diabetic patients in Cheshire. Healthcare professionals are given the tools to implement personalised patient-centric care plans to empower patients to adopt healthy behaviours and make healthy choices outside the clinical environment, which aids patients in improving their health outcomes and engagement in their health.

Improvement in operational efficiency

With 24 healthcare professionals set up on the software across the practices this gives them a unique ability to share content with their patients immediately and with minimal time. The average session length for healthcare professionals was 17 minutes and the total cumulative time spent across all practices was 2,739 minutes, an average of 1 hour 54 minutes per healthcare professional for all their patients on the trial.



Diabetes Management in Primary Care: RCT and Study



Enhanced capabilities and capacity of healthcare professionals:

The software is designed to support a conversation between patients and healthcare professionals that focuses on what matters most to the patient and results in the joint setting of personalised goals, actions and objectives, that are recorded in the software. With patients placed in the active treatment group receiving a care planning appointment with their health professional, they were able to set health objectives unique to them and expressed in a human way. 90 specific health objectives were set in the software, 30 of which were linked to weight and 21 associated with HbA1c. More personalised objectives included "to live as long as I can" and "very tired - I want to try and build back up stamina to do daily activities without effort". A common health objective was to reduce reliance on medication in controlling diabetes.

Before our care plan software was used by these patients, no goals or actions were recorded and shared between these healthcare professionals and patients, and no supporting resources were mapped to support people in this conversation (other than a few leaflets and information that may be printed out). However, as a result of this intervention, 280 useful goals were shared in care plans, 343 goals were then joined by users, 1021 actions were completed and patients engaged with their own trackers 2483 times in total, an average of 24 times per user.

This relationship with the health professional sharing goals, and the user accepting these and then tracking against them shows users have an appetite to keep up their plan during the periods between their health appointments and demonstrates Healum's solutions' ability to provide access to the right information at the right time to patients.

The library of reliable, signed-off resources means that information is accurate and easily accessible, this allows patients to learn and remember important things their healthcare professional has told them in their appointment, without spending hours researching and potentially finding incorrect or unsafe information on the internet. This was supported by one of the users in their interview stating they would prefer to use the app than search engines on the internet and described the app as a "one stop shop for resources".

The tracking function within the app allows patients to become more involved in their care by tracking different metrics that indicate how well they are progressing, and the sharing of this information directly to their HCP.

"Ever since I have been a diabetic I have tracked my weight, I normally log this on my computer and print it out to take to the diabetes nurse.

With the app I can keep track of my weight, as well as other metrics much more easily, and the GP can see these straight away."



"I don't normally just google for information to do with my Diabetes because you can't trust everything, I prefer to stick to trusted sources like Diabetes UK which you have on the app."



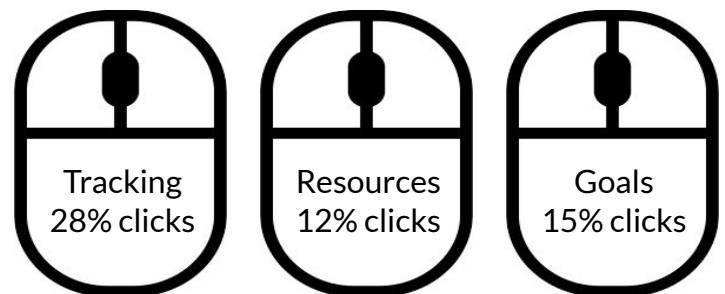
Diabetes Management in Primary Care: RCT and Study



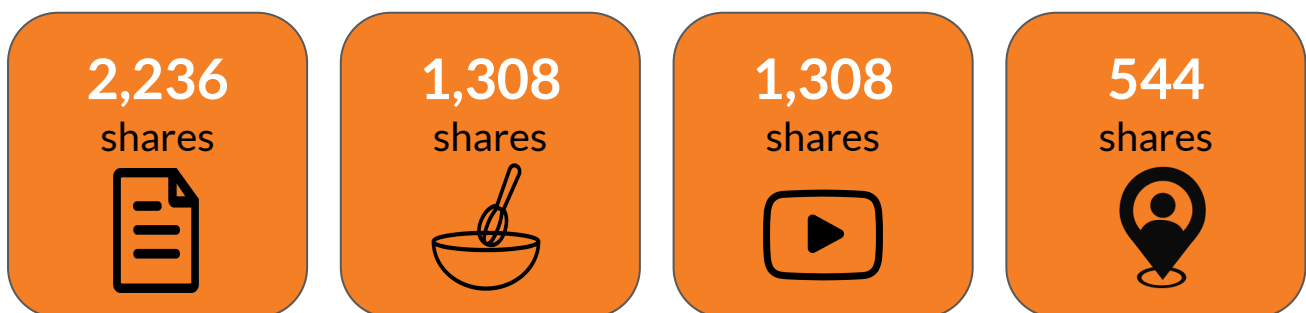
Addressing health inequalities:

Self monitoring is a recognised behavioural change technique to address people's underlying motivation. It addresses patient motivation and supports them to be motivated, it helps patients' underlying understanding of what the best choices are for them, and brings relevant opportunities to them that they otherwise would not have discovered to support them in improving their health. The Healum app had different functions developed to encourage self monitoring - these include the goals function where users can set health goals and different actions to help them achieve these, the tracking function where app users can track different metrics relevant to their physical and mental health, and the resources function where they can find relevant, personalised resources to help them learn how best to manage their condition.

All these functions were popular with users: the tracking function within the app had 11,017 clicks (28% of total clicks), the resources section had a total of 4,646 clicks (11.8% of total clicks), and the goals section was clicked on 5,905 times (15% of total clicks).



Healthcare professionals are able to share resources directly from the database of resources to each patient individually, allowing them to tailor the information sent to each patient's specific needs, taking into account their socioeconomic and cultural background. Resources were shared 5,396 times in total to patients through the software, which then notifies the patients on the app. The breakdown of this number into the different resource types is as follows: articles were shared 2,236 times, local services were shared 544 times, recipes were shared 1,308 times and videos were shared 1,308 times. The division of resources shared within different categories were as follows: resources related to diabetes management were shared 2,255 times, those related to diet & wellbeing were shared 1,084 times, those related to wellbeing were shared 896 times, those related to physical activity were shared 499 times, those related to lifestyle were shared 400 times and those related to stress & anxiety were shared 262 times.



Outcomes for patients

The Healum app helps users to access high quality, personalised care so that they can effectively manage their Type 2 Diabetes. The use of Healum's software and app as part of the trial has resulted in::

- **Improvement in patient health outcomes** as measured by reductions in BMI and HbA1c
- **Improvement in the quality of life** of patients as well as their experience of care through additional support to help manage their Diabetes in a way that they find empathetic, supportive and relevant.
- More **personalised care** through the discussion of barriers and obstacles with their healthcare professional, and subsequent personalised content.

Improved health outcomes achieved on the program

Within this RCT, the active treatment group had better health outcomes than the control group, the patients that received a care plan had better outcomes than those that did not, and the patients within the active treatment group that had higher engagement with the app also had better health outcomes than those with lower engagement.

The active treatment group experienced a higher reduction in BMI and HbA1c than the control group. The average percentage change in HbA1c for the treatment group over 6 months was -7.37% (\pm se 1.40%), but 1.75% (\pm se 2.05%) for the control group. The average percentage change in BMI for the treatment group was -0.66% (\pm se 0.42%) and was -0.23% (\pm se 0.52%) for the control group. Also, when comparing the participants that had a care plan to those that didn't, 73.08% of the active treatment group reduced their HbA1c, compared to just 44.59% of the control group. For BMI, 59.70% of those with a care plan had a reduction, compared to 46.03% of those that did not.

Control group (usual care)	+1.75% average change in HbA1c	44.59% of participants reduced HbA1c	-0.23% average change in BMI	46.03% of participants reduced BMI
Active treatment group (app + usual care)	-7.37% average change in HbA1c	73.08% of participants reduced HbA1c	-0.66% average change in BMI	59.70% of participants reduced BMI



Diabetes Management in Primary Care: RCT and Study



Higher engagement with the app, as measured by session number, led to better health outcomes for users. The average HbA1c change was -12.28% for the group of users with at least 10 app sessions within days 91-180 after app download, compared to 0.18% for those that used it just once within that time period. To increase app engagement during the trial, we launched a 'calendar trigger' whereby patients received a 12 week schedule of relevant diabetes content and information.

Improvement in quality of life and care experience through additional support in an empathetic, supportive and relevant way

Patients received a more empathetic, supportive and relevant experience through the use of the software and connected app and the functions including resource sharing and goal setting. The ability to share supportive content directly to patients, and then monitor their progress, helps to build better understanding and empathetic support between patients and the healthcare professionals.

Over the course of the trial 6,279 healthy choices and actions have been undertaken by app users, this includes a combination of actions ticked off, custom goals created, trackers used and resources viewed. This works out at an average of 61 healthy choices and actions per app user. In total there were 2,078 app sessions by app users, with 30% of users using the app at least 10 times in the first 30 days and 84% of users using the app at least twice in the first 30 days.

Patients in the active treatment group demonstrated an improvement in their self-measured quality of life score over the course of the trial, shown by an average increase in their EQ-5D-5L rating of 0.0464. Whereas, for those in the control group, the quality of life decreased, shown by their EQ-5D-5L rating decreasing by 0.0086 on average. Patients in the active treatment group also demonstrated an improvement in their self-measured standard of their health shown by their EQ VAS score increasing by 8.2% on average. For those patients in the control group, their EQ VAS score changed on average by -2.79% indicating a reduction in patients' self-measured standard of their health.

"Having the app has made me feel more motivated. Before, whenever I went to the GP, it was all about the drugs I must take and that was it. I was never really told about the things I could do myself to help my diabetes management. However, during the care plan appointment and having the app, I was informed about other things I could do. It's been a helpful reminder to do things myself to help my health."



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Diabetes Management in Primary Care: RCT and Study

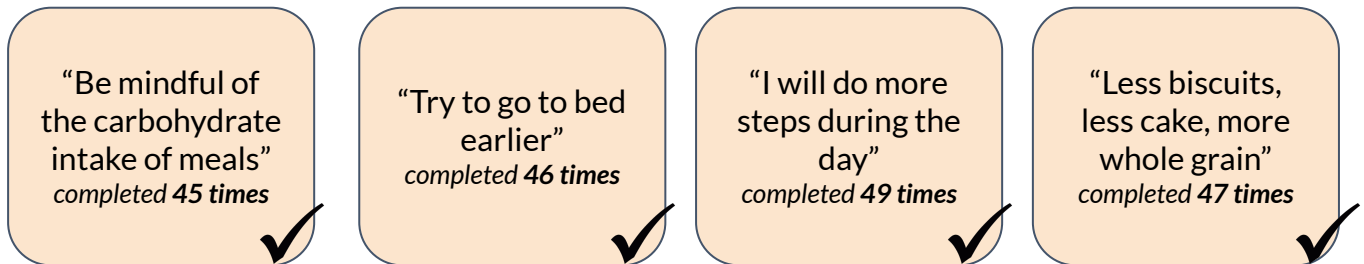


More personalised care through the discussion of barriers and obstacles with their healthcare professional, and subsequent personalised content

For patients involved in the active treatment group of this RCT, they are provided with personalised behavioural change support through the functions of the connected software and app, including tracking using markers, joining goals and creating custom goals, completing actions and viewing resources.

Overall markers were tracked over 2,483 times, the three most popular of which were weight, steps and water. These tracked markers are visible by the patients' respective healthcare professionals, allowing them to get insights into the progress of patients and provide feedback in follow up appointments.

343 goals were joined in the software, including a mixture of personalised 'custom goals' and preset goals from the library, examples include "To be healthy enough to have a safe pregnancy", "I want to get out in nature more" and "Fit into my evening dress for Diabetes Fundraiser". Actions can be set that act as steps to help each patient achieve a particular goal, these were completed over 1,000 times. Popular actions amongst app users included "Be mindful of the carbohydrate intake of meals" which was completed 45 times, "Try to go to bed earlier", completed 46 times, and "I will do more steps during the day" completed 49 times. Custom actions included "Less biscuits, less cake, more whole grain" which was completed 57 times and "Not to use iPad" which was completed 36 times in total.



Resources were viewed 2,284 times, with the most popular resources including "Kimchi Pasta", "1-minute omelette", "Normal' HbA1c - setting the record straight", "Your Lifestyle impacts your weight" and "How to look after your feet if you have diabetes". The resources within the app consist of a range of recipes, articles, local services and videos.



By allowing patients to reshape their journey with goals, actions and markers they choose, they are provided personalised behavioural approaches they can actually identify with.



Testimonials

"The act of thinking and capturing of goals I think was really good. Before this, I didn't really feel as if anyone had asked me those questions. I didn't really consciously think about them until the app presented the opportunity. So that was the one big positive impact on me at the start."



Active treatment group patient

"Having the app has made me feel more motivated. Before, whenever I went to the GP it was all about the drugs I must take and that was it. I was never really told about the things I could do myself to help my diabetes management. However, during the care plan appointment and having the app I was informed about other things I could do - it's a helpful reminder to do things myself to help my health."



Active treatment group patient

"Quite often all you need is a reminder - for example I forget that I shouldn't be eating cake. The app reminds me to do certain things and keep on top of my management."



Active treatment group patient

"I think the app is a very useful tool - it has the right things on there to help and motivate you."



Active treatment group patient



Future Prospects

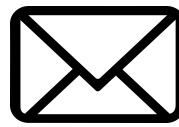
Following these promising results, we welcome any Primary Care Network of GP practice who is interested in trying the product for themselves, to reach out at hello@healum.com to learn more.

During this Digital Health Technology Catalyst Trial, we have been researching and developing our live learning network. This network will support healthcare professionals to understand which combinations of medical care and lifestyle choices work best for people with one or more long term conditions in partnership with patients.

If you are a healthcare professional, researcher or commissioner that is interested in the power of AI to support teams of healthcare professionals to deliver personalised care and support for people with multiple long term conditions; or if you are interested in accelerating the adoption of our technology as part of the NHS Digital Innovation Partnership then get in touch with us here: research@healum.com.



hello@healum.com



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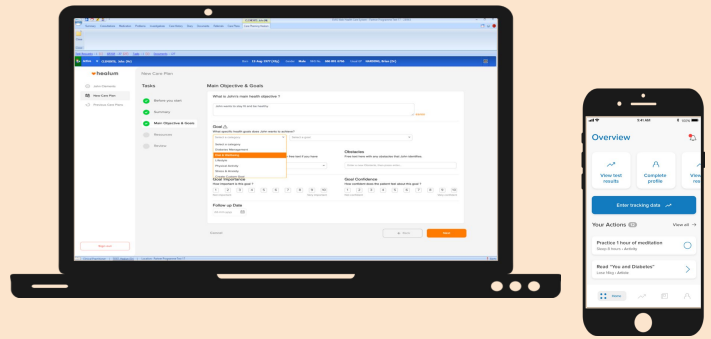
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About Healum



The Healum system, its cloud-based interoperable software and connected client facing service, enable providers of primary care to improve health outcomes, improve access to care, and to improve the efficiency of delivering care to patients with one or multiple term conditions. The functions of the system allow primary care providers to:

Motivate, monitor and support patients in a personal way

Help patients manage their condition by providing personalised information

Providing the tools to enhance the capabilities and capacity of teams

Work across multidisciplinary teams

Provide support and education to patients

Access data and real world insights to improve clinical pathways

Deliver routine services in a more efficient way

Create digital care plans that are tracked, recorded, accessible and dynamic

Manage databases of community based assets

