

## INR self-testing



Inhealthcare and Health Call (a collaboration of seven NHS Foundation Trusts across the North East and North Cumbria) has collaborated with one of the largest integrated acute and community service providers in England to deliver a home monitoring service for the 2,500 warfarin patients in the region.

The new automated service at County Durham and Darlington NHS Foundation Trust (CDDFT), has transformed how patients on long-term anticoagulation medication warfarin are monitored. The service enables patients to self-test at home and receive their adjusted warfarin dose via 4S DAWN's anticoagulation dosing software. Previously patients on warfarin needed to attend clinic every few weeks for a simple blood test to check how quickly their blood clots, which is measured using the international normalised ratio (INR).

### Objectives

With warfarin clinics at maximum capacity, the trust needed to look at ways of delivering more efficient anticoagulation services.

The main objectives of the project included:

- To cut costs by reducing the time patients spent in the clinic
- To find new ways to tackle skill shortages by better monitoring, triaging and reducing unnecessary or non-attendance at clinical appointments. A key aim was to improve the use, focus and skill mix of existing staff without compromising the quality of care delivered.
- To begin to develop self-management as a way to meet the NHS' Five Year Forward View vision as well as to alleviate some of the pressures on the current service. This would increase capacity and efficiency, and also improve the warfarin clinic service for those complex patients requiring quality clinician time.
- To bring convenience to patients and reduce disruption to their lives.

### Service

With the new service, the patient takes a finger prick blood sample and inserts it into the Roche INR self-testing device (CoaguChek®). The patient sends their new reading securely to the local clinic via an automatic phone call or app. Data feeds into anticoagulation software provider 4S DAWN as well as into the patient record. The new warfarin dosage is calculated in 4S DAWN and is then automatically relayed back to the patient.

The service enables patients the freedom to live a normal life, enabling them to go on holiday, and still send in their readings remotely. Patients will no longer have to take regular time off work, pay for travel or clinic car parks. As of March 2019 there were 524 patients on the service.

The simple to use software means that patients and carers of all technical abilities can benefit - as long as they have a landline, mobile or access to the internet.





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## How the service works



Ian Dove, business development manager at CDDFT, said:

*"The service has been a great success. We clinically led the development of a pathway for patients on warfarin treatment. It operates using a digital interface opposed to regular attendance at the warfarin clinic. Using digital health, patients are able to self-test their International Normalised Ratio, a key measure for warfarin users, using a remote monitoring device at a time and in a place to suit their individual circumstances and lifestyle. The system then allows a nurse to identify the required warfarin dose and send the new dose information back to the patient remotely."*



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## Results

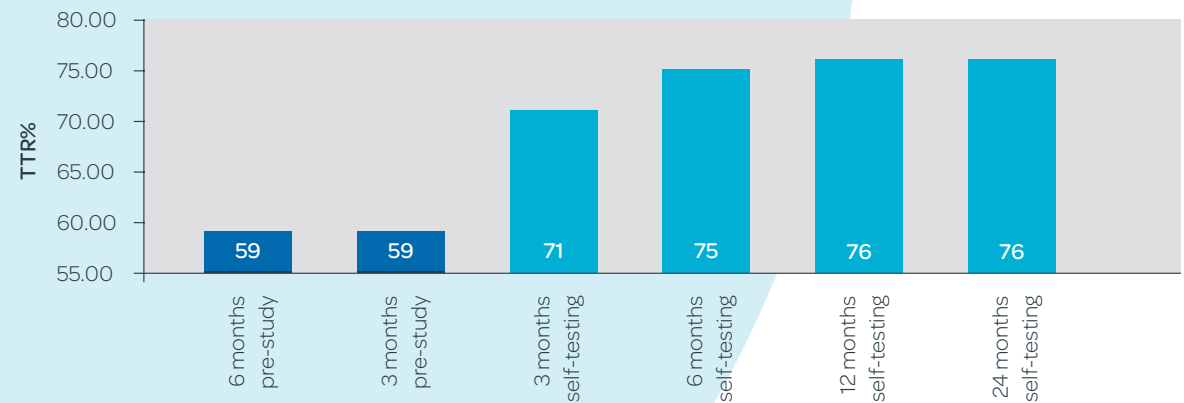
(Data taken from a cohort of 200 patients)

- Time in Therapeutic Range (TTR) increased by an average of 20% for 70% of those on the service.
- Clinicians felt that they were able to spend more quality time with the most complex patients requiring their care.
- The time required to dose patients fell from an average of 5 minutes to 3 minutes with the introduction of self-testing. With 4S DAWN's added integration 3 minutes has now reduced to just 30 seconds. Ian Dove said: *"With this 4S DAWN update our INR service delivers dosing information to our users at even greater speed. It reduces the burden on our staff to input data giving them more time to treat. The ease with which people on warfarin can test remotely and securely update their records showcases the role digital solutions can play in the future of healthcare across the UK."*
- From March 2013 – to March 2016, the service has saved the trust over 50,000 appointments.
- High patient satisfaction feedback with 100% of those on the service saying they would recommend the service to others. CDDFT currently monitors approximately 400 patients remotely. *"Sustainability has been strong with 90% of patients who joined the programme three years ago still part of it." The reduction in appointments has lessened the impact on patients' lives. Patients reported enjoying the day-to-day flexibility, and also being able to self-test on holiday,"* says Ian.

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Average time in therapeutic range (TTR)  
(Cohort of 200 patients)



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## Digital inclusivity

The services reaches patients without the internet, those in rural locations and those without smartphones. Patients can choose to use an app or an automated phone system, meaning the service is accessible for all.

Steve Clark, a patient, said: *"Self-testing is a very simple and easy process. Having to attend warfarin clinic several times a month had become a real chore and was challenging to my lifestyle. I used to find it stressful leaving work at lunchtime, driving through traffic and finding a parking space at the clinic and then rushing back afterwards. Self-testing makes life much easier for me. It gives me control. I can test myself at home, work and on holiday. My time spent in ideal therapeutic range has increased dramatically. Although there is less face-to-face contact with clinicians, I am in regular contact with them and sometimes I think they know me better than I know myself."*

Jeannie Hardy, telehealth programme manager at CDDFT, said: *"We've had a number of our patients tell us that when they come to clinic they have to take the time as holiday. That of course isn't good from a health point of view, that people aren't getting their holidays and their time off."*

Sister Tracy Murphy a nurse at CDDFT, said: *"The new system is optional although enthusiasm for it is very high among patients, primarily because it is so much more convenient for them. In addition, the training they receive gives patients a greater understanding of what can affect their INR, meaning they are finding it easier to remain within their ideal therapeutic range. A major benefit of this stability is a reduced risk of stroke."*

## Benefits

### For patients

- More flexibility for patients
- Reduced risk of stroke
- Improved clinical outcomes
- Empowers patients to self-manage
- Less clinic visits and associated costs
- Technology is easy to use

### For Healthcare professionals

- Cost savings
- Reduced workload
- Improved clinical outcomes
- Reduced risk of stroke
- Able to spend more quality time with patients that need to attend the clinic



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