



Heart failure remote monitoring for people with a cardiac device: TriageHF Plus

Case studies

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Contents

Overview 3

Reviewing current services and implementation 4

 Reviewing current services 4

 Implementation 5

Outcomes and learning 6

 Outcomes 6

 Learning 6

Supporting information 7

 Quotes 7

 Contact details 8

Overview

Organisation: Manchester University NHS Foundation Trust; Manchester Royal Infirmary

Organisation type: NHS Trust

People with decompensating heart failure (HF) have traditionally been asked to contact their HF team or seek medical attention for worsening symptoms, but this often happens too late, or people do not recognise these symptoms at all. However, by adopting remote monitoring technologies with an algorithm that can alert clinical teams to people at high risk, preventable hospitalisations can be potentially avoided. The TriageHF Plus pathway was developed in 2016 as an early warning system that combines HF alerts from cardiac devices with a structured phone-based assessment by a HF specialist.

Reviewing current services and implementation

Reviewing current services

Patients with HF typically experience episodes of decompensation requiring admission to hospital. Early treatment of deteriorating HF with medications at home can stabilise their condition and avoid potentially preventable hospital admissions.

Current practice places responsibility on people to contact their HF team or seek medical attention when they experience worsening symptoms. However, people often experience symptoms too late, do not recognise the signs of worsening HF, or do not seek medical attention until their condition has reached a critical point.

Remote monitoring technologies offer a solution. Cardiac devices (cardiac resynchronisation therapy and implantable defibrillators) can detect pre-clinical signs of HF decompensation using an algorithm combining multiple physiological parameters (for example, thoracic impedance, heart rate and rhythm, and physical activity). If a significant change in health data is detected, the device can be programmed to send a HF alert to the clinical care teams, notifying them of people who are at high risk of hospitalisation in the next 30 days.

Despite good evidence of predictive value, previous clinical studies examining remote monitoring in HF proved ineffective, halting any change to guidance. However, these earlier studies used older technology and did not utilise algorithms.

Fast forward to 2016 and technology had moved on. Anecdotally we could see this data was clinically useful, predicting HF hospitalisations before the symptoms were present, but it was being ignored. People admitted to hospital with fulminant decompensated HF suffered long lengths of stay and poor outcomes. We identified a clear opportunity for improving patient care by actioning high-risk remote monitoring data (previously referred to as HF alerts), improving organisational efficiency by using a data-driven approach to divert resources to people at high risk, facilitating early specialist intervention, and avoiding potentially preventable hospitalisations.

Implementation

The TriageHF Plus clinical pathway, a pragmatic early warning system using device alerts to trigger clinical reviews, was developed in 2016 to combine HF alerts from cardiac devices with a structured phone-based assessment by a HF specialist, most often a nurse.

Devices capable of remote monitoring are programmed to send a HF alert to the hospital if a person's risk score crosses the 'high' threshold dictated by the TriageHF algorithm. Upon receiving a HF alert, the HF nurse contacts the patient to undertake a phone-based clinical assessment. Acute issues are identified and actioned and a management plan put in place, for example a change to medications. All people are additionally followed up after 30 days to assess the impact of the intervention.

The pathway was developed at Manchester Royal Infirmary, and a clinical study involving 3 Greater Manchester sites was launched in 2019. This was gradually expanded to include 6 sites by 2024. The TriageHF Plus study (NCT04177199) aimed to evaluate the clinical efficacy of the pathway and cost-effectiveness of its implementation. In 2024, we published our first set of results from phase 1, demonstrating a 58% reduction in hospitalisations compared with usual care. We submitted a cost-effectiveness report to the NICE Diagnostic Assessment Programme, which published its recommendation in October 2024 that TriageHF (and HeartLogic) are used "as options for algorithm-based remote monitoring in people with cardiac implantable electronic devices (CIEDs) who have heart failure". This new guidance allowed us to present our case to the local commissioning group to ensure long-term adoption of the pathway which is embedded into usual clinical care.

Outcomes and learning

Outcomes

Implementation of the TriageHF Plus clinical pathway was associated with a 58% reduction in all-cause hospitalisations.

The TriageHF Plus clinical pathway is cost effective, equivalent to a net monetary benefit of £4,158 (£1,935 to £5,781) per patient over their lifetime.

Learning

The TriageHF Plus project at Manchester Royal Infirmary, which is part of a wider Greater Manchester collaboration, has been a great success. Despite significant challenges, including the COVID-19 pandemic, the pathway has continued to run with minimal disruption for over 5 years. Our main challenge to operations has been staffing, a widespread issue within HF services across the country. Although the overall framework of the pathway has not changed since its implementation, a regular review of data and feedback to staff has led to iterative improvements. This includes opportunistic patient education and medication reviews to ensure that as well as addressing acute issues, we routinely take the opportunity to ensure people receive class 1 guideline-recommended medical treatment for HF.

Supporting information

Quotes

"TriageHF Plus has been a long but incredibly rewarding journey from inception to delivery. The main driver of success has been a retention of a core project team including clinical academics, HF healthcare professionals, Medtronic representatives and statisticians, all of whom shared a common goal to bring research into practice. Presenting our finding to NICE and seeing our research contribute to changes in national guidance has made it all worthwhile, and crucially given us the backing we need to justify sustainable funding for the pathway, ensuring equitable access to this service for patients across the region."

Dr Joanne K Taylor, Academic Clinical Lecturer, University of Manchester and Manchester University NHS Foundation Trust.

"HF alerts allow us to monitor and manage patients in between their scheduled clinic appointments and if a deterioration in health data is detected we can provide swift assessment and prompt effective treatment using proven treatments in HF. This approach of using health data and alerts from specialised pacemakers and defibrillators has already been shown to significantly reduce emergency admissions to hospital by more than 50% and, as previously described by the British Heart Foundation, has been a 'game changer' for people with heart failure."

Dr Fozia Ahmed, Consultant Cardiologists Manchester University NHS Foundation Trust and lead investigator on the TriageHF Plus study.

"The NICE guidance will support better access for patients to receive evidence-based, cost-effective, alert-based monitoring. This should result in better outcomes for patients, delivering care closer to home while driving efficiencies and savings for the NHS."

Alison Scott, Senior Heart Failure Market Development Manager, Medtronic Inc.

"We feel Triage HF has served as a useful remote monitoring tool that has assisted us in managing specialist care for our heart failure patients. Its proactive and preventative approach has enabled us to provide early assessment and intervention, thus preventing hospital admissions."

Hayley Armitage, Claire Ashworth, Christina Muldoon and Jane Fitchet. Heart Failure Specialist Nurse team at Manchester Royal Infirmary.

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