



Health Innovation
WEST MIDLANDS

Heart Failure Toolkit

A resource for primary care health care professionals

Created by Health Innovation West Midlands (HIWM)

Authors:

Philippa Richards – RN and CVD Innovation Project Manager, Health Innovation West Midlands

Joanne Lees –RN and HIWM HF Clinical Champion

Jacqui Hyland – RN and HIWM HF Clinical Champion

Jacqui Elson-Whittaker- RN and HIWM HF Clinical Champion

Damsel Kuriakose - Pharmacist and WMAHSN HF Clinical Champion

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Scope of Toolkit

- The NHS Long Term Plan and the Cardiac Pathways Improvement Programme both indicate that improvement in heart failure is part of the national NHS agenda.
- All heart failure patients will access GP services and heart failure patients have a high hospital admission rate.
- This toolkit is for health care professionals working within primary care and aims to give health care professionals top tips of how they can be managed effectively in primary care.
- Advice and guidance is always available from your secondary care teams or specialist heart failure nursing teams, but this toolkit aims to enhance that support for the primary care teams



[Image_ref](#)

What is Heart Failure

- Heart failure (HF) is a common complex clinical syndrome of symptoms and signs that occur when the heart is unable to pump blood around the body as effectively as it should.
- HF can occur at any age but is most common in older people.
- HF is caused by structural or functional abnormalities of the heart and usually occurs because the heart has become too weak or stiff.
- HF is a long-term condition that tends to get gradually worse over time.
- HF cannot usually be cured; with appropriate medication the symptoms can often be controlled for many years.

The main symptoms of HF are:

- breathlessness,
- fatigue
- oedema (fluid retention).

TYPES:

The degree of heart failure is based on measurement of the left ventricular ejection fraction (**LVEF**). The ejection fraction (EF) is a measure of how much blood the left ventricle pumps out with each contraction. It is expressed as percentage. **A normal ejection fraction is considered to be greater than or equal to 55%**. Heart failure patients with an ejection fraction of 50% or more are classed as having heart failure with preserved ejection fraction (**HFpEF**). In HFpEF the heart can pump blood out but is unable to relax to fill with blood sufficiently.

Patients with an **ejection fraction of less than 40% are classed as having heart failure with reduced ejection fraction (HFrEF)**. HFrEF is also referred to as left ventricular systolic dysfunction (LVSD). When a patient has HFrEF the left ventricle of the heart does not pump well enough to adequately meet the needs of the body.

Around 60% of all heart failure patients have HFrEF, however in England, only 33% of heart failure patients have an LVSD/HFrEF code in their primary care clinical record. There is a strong evidence base showing that optimisation of medication can reduce morbidity and mortality in patients with HFrEF

CAUSES:

- Coronary heart disease
- High blood pressure
- Heart valve disease
- Arrhythmias, such as atrial fibrillation
- Cardiomyopathy
- Congenital heart disease

What should we do?

The overall aims of improving heart failure care within your practice should be to:

- Improve the detection of patients with heart failure, ensure timely diagnosis (Natriuretic Peptide Tests and echocardiogram) in primary care.
- Improve the quality of registers in primary care to ensure patients with heart failure are appropriately coded (HF_rEF and HF_pEF).
- Ensure that patients with HF_rEF receive a 12 monthly review and optimisation of their therapy to prevent avoidable hospital admissions.
- Ensure that patients receive optimal management according to [NICE](#) guidance.

Why should we do it?

Benefits -

For the patient:

- Initiation and optimisation of evidence-based therapies
- Improved symptom control
- Improved quality of life
- Education and empowerment to self-manage
- Reduction in readmissions

For Primary Care Networks (PCNs) and GP practices:

- Increased recorded heart failure prevalence leading to an increase in QOF income
- Improved coding, resulting in an up-to-date heart failure register enabling practices to recall patients with ease for ongoing review
- Education and upskilling of clinical staff

For the whole NHS:

- Reduction in non-elective admissions and readmissions for heart failure
- Opportunity to have improved links between primary and secondary care

A WHOLE PATHWAY APPROACH

Undertaking quality improvement (QI) projects within your practice to improve heart failure does not necessarily need to be an onerous task.

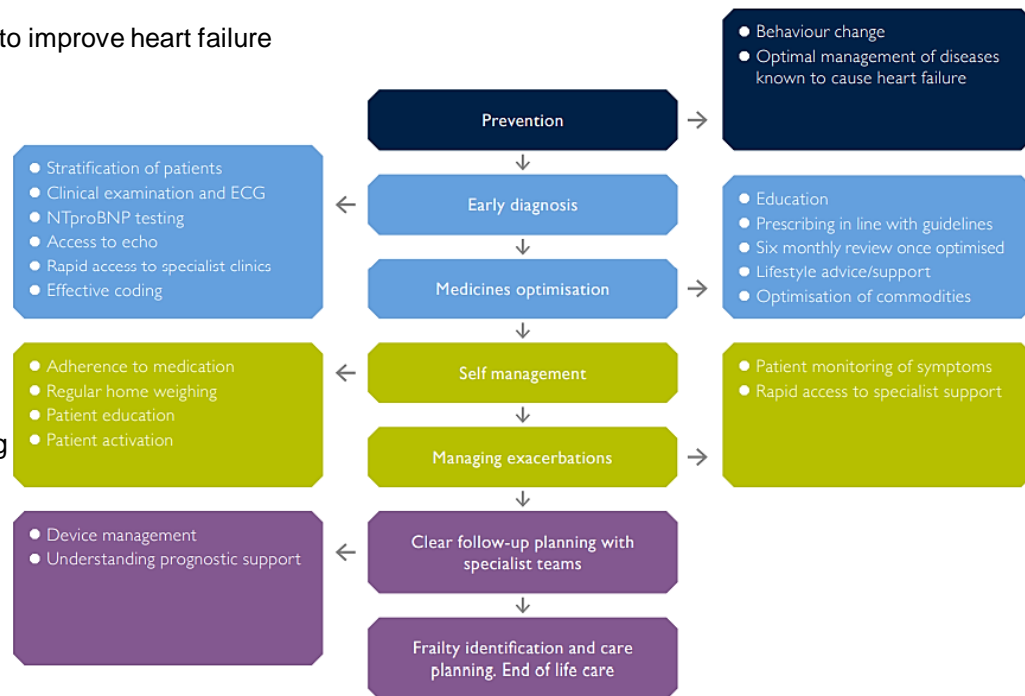
Small steps can lead to big improvements in care. However, it is advised that you look at a whole pathway approach.

This pathway cited in the [QAHSN HF toolkit](#) easily describes where primary care can implement interventions that lead to improvement.

This toolkit addresses where improvements can be made across the whole pathway

Education is equally important, and the HIWM can deliver upskilling sessions in which all PCNS can access.

Care model for heart failure with reduced ejection fraction

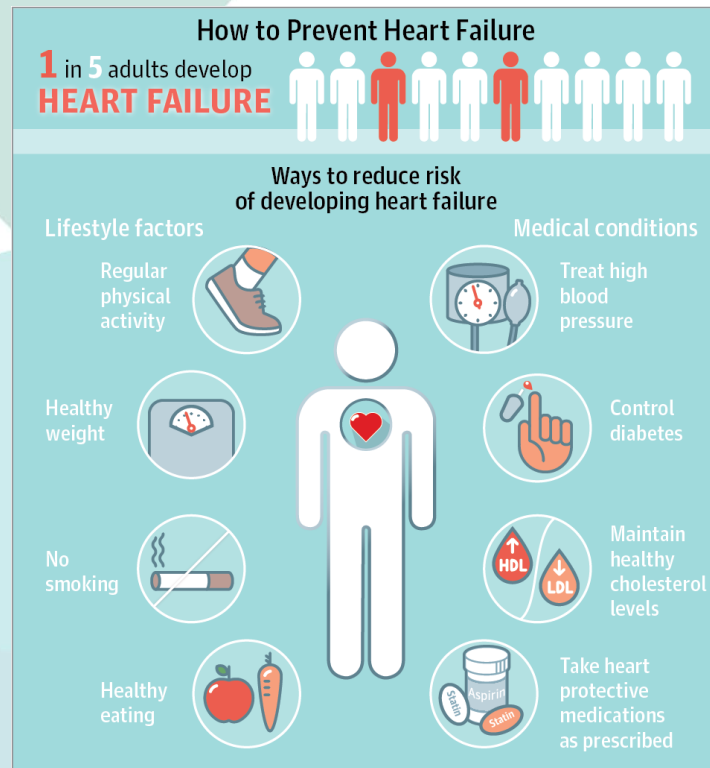


How can primary care teams aid in the prevention of heart failure

Prevention is key. When you have patients increasing in age and those with other pre-existing cardiovascular risk factors or conditions it is important to think of preventing heart failure and other CVD conditions early.

Here is a checklist that you can use as a guide when considering prevention:

- Perform [NHS Health Checks](#) and utilise the [QRISK](#) tools
- Case finding and optimise hypertensive patients using a framework such as the [UCL Proactive care frameworks](#)
- Optimise lipid treatments using the [national lipid pathways](#). The West Midlands also has a FH service that you can refer to.
- Rate control patients with atrial fibrillation and anticoagulate them effectively. This [AF toolkit](#) is useful to use
- Refer diabetic patients to the [diabetes prevention programme](#)
- Utilise the [digital weight management service](#)
- Refer smokers to your local [smoking cessation](#) service
- Utilise any available [exercise prescription](#) service
- Utilise **social prescribers** or **community connectors** within your area to assist patients in setting goals to improve their overall cardiovascular health.
- Perform **annual reviews** for patients with existing heart disease or risk factors. Maximise the use of the workforce to undertake these reviews.



Why is case finding important?

The estimated true prevalence of heart failure is 1.4%, however currently in England the prevalence is approximately 1.0%, leaving a **detection gap of over 300,000 people**. Around 60% of all heart failure patients have HF_rEF, however in England only 33% of heart failure patients have an LVSD/HFrEF code in their primary care clinical record.

There is a strong evidence base showing that optimisation of medication can reduce morbidity and mortality in patients with HF_rEF.

The objectives of case findings are as follows:

- **Increase heart failure prevalence**
- **Improve LVSD coding**
- **Increase the uptake of medications as per NICE guidelines**

Heart failure (HF)

Indicator	Points	Thresholds
Records		
HF001. The contractor establishes and maintains a register of patients with heart failure	4	N/A
Initial diagnosis		
HF008. The percentage of patients with a diagnosis of heart failure on or after 1 April 2023 which: 1. Has been confirmed by an echocardiogram or by specialist assessment in the 6 months before entering on to the register; or 2. If registered at the practice after diagnosis, with no record of the diagnosis originally being confirmed either by echocardiogram or by specialist assessment, a record of an echocardiogram or a specialist assessment within 6 months of the date of registration.	6	50–90%
Ongoing management		
HF003. In those patients with a diagnosis of heart failure due to left ventricular systolic dysfunction or whose heart failure is due to reduced ejection fraction the percentage of patients who are currently treated with an angiotensin-converting enzyme inhibitor (ACE-I) or Angiotensin II receptor blockers (ARB).	6	60–92%
HF006. The percentage of patients with a diagnosis of heart failure due to left ventricular systolic dysfunction or whose heart failure is due to reduced ejection fraction, who are currently treated with a beta-blocker licensed for heart failure.	6	60-92%
HF007. The percentage of patients with a diagnosis of heart failure on the register, who have had a review in the preceding 12 months, including an assessment of functional capacity and a review of medication to ensure medicines optimisation at maximal tolerated doses	7	50-90%

HF006 and HF007 are difficult to interpret due to the variability in the LVSD coding. This is due to denominator (number of people with HF due to LVSD) is inaccurate and underestimates the total LVSD burden. Besides, the QOF data only records if a patient has been prescribed a drug, not if they have been prescribed the maximum tolerated dose. By addressing the quality of LVSD coding will improve the interpretation of QOF data.



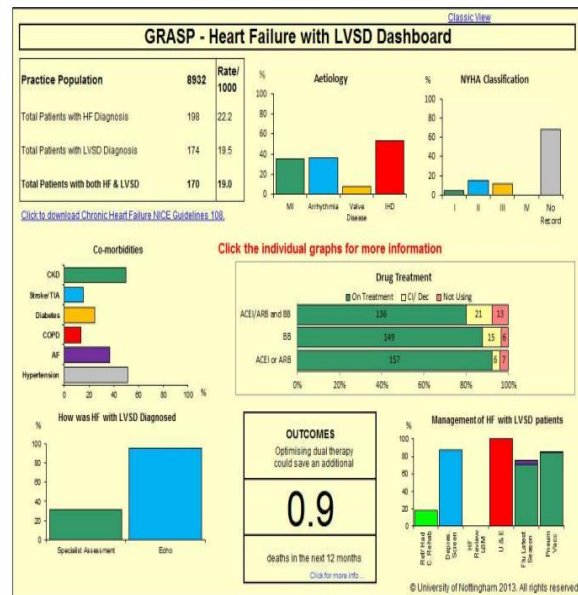
Case finding tools

There are many case-finding tools available for practices to obtain to aid them in case finding.

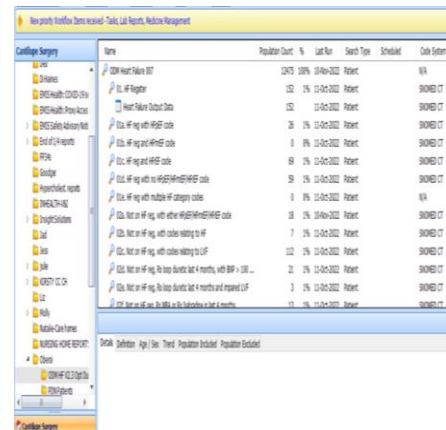
They are there to assist GP practices to interrogate their clinical data enabling them to improve management and care of HF patients with LVSD. Many provide detailed reports to enable practices to prioritise which patients to review.

This list is not exhaustive, but these are some that we are aware of that other primary care networks have used to aid case-finding.

- ATTEND 2 HEART FAILURE, a tiered paid clinical platform developed by Interface Clinical Services [Attend2 Heart Failure | Interface CS \(interface-cs.co.uk\)](#)
- GRASP HF - Free to practices in England registered with the PRIMIS Hub service [nottingham.ac.uk/primis/joinus](#)
- ENHANCE-HF (Oberoi Consulting) Paid service provided by Servier and developed and delivered by Oberoi Consulting [Project HF Page – Oberoi Disease Management \(oberoi-dm.co.uk\)](#)
- ARDENS TOOLS – Paid service but many practices already would have this system embedded in their systems, thus making it a more familiar system to work with, and provides templates and alerts for EMIS. [Heart Failure : Ardens EMIS Web](#)



To access the image, [click here](#)



Ardens case finding tool, [click for the image](#)

Performing your own case finding exercise

The aim of the code cleansing search is to identify patients where a diagnosis of HF has been made previously but has not been correctly coded. By searching through hospital discharge letters, cardiology letters and ECHO reports coding can be improved.

You could look for the following:

- Patients with a previous high NTproBNP but not on the register
- Patients where LVSD is recorded but not heart failure
- Patients where a code has been used but not a QOF recognised code
- Patients on spironolactone or epleronone but not on the HF register
- Patients with a HF code but not coded as LVSD.

The next step would be to perform virtual reviews of patients who have HFReF/ LVSD to create a risk-stratified list of patients, some of whom will need further action.

Priority One -Symptomatic and/or unplanned admission in the past six months and fully optimised on medications available in primary care	Discuss with specialist team
Priority Two Symptomatic and/or unplanned admission in the past six months and not fully optimised on the range of medications available in primary care	Optimise medicines in primary care Consult with HF specialist team if unsure of titration guidance.
Priority Three - not symptomatic and no unplanned admissions in past six months	Check therapy optimised. Review every 6 –12 months.

What can I do in my practice?

- Consider using one of the tools in this toolkit to case find your patients
- Talk to IT colleagues, medicine management colleagues, or colleagues within practice that have experience of coding and performing searches and utilise their experience to undertake a case-finding exercise.
- Once a code cleansing exercise has been done you can ensure that:
 - all patients with heart failure are given a heart failure code
 - all patients with HFrEF are given the appropriate code
 - identify patients coded as having HFrEF who are not on optimal treatment in preparation for reviewing these patients.



[Image ref](#)

Patient breathless, patient tired, patient has swollen ankles.. Think heart failure

How can we quickly assess?

Early diagnosis can enable patients to live longer, healthier lives. 80% of heart failure is currently diagnosed in hospital, despite 40% of patients having symptoms that should have triggered an earlier assessment. The following four interventions will be key in enabling you to diagnose heart failure earlier and potentially preventing hospital admissions for these patients.

NTpro BNP blood test

ECHO

ECG

Breathlessness Clinic Referral

NTProBNP Blood Test

Natriuretic peptides are substances made by the heart. Two main types of these substances are brain natriuretic peptide (BNP) and N-terminal pro b-type natriuretic peptide (NT-proBNP). Normally, only small levels of BNP and NT-proBNP are found in the bloodstream. High levels can mean the heart isn't pumping as much blood as the body needs, therefore an indicator of heart failure.

If the NT-pro-BNP level is **above 2000 ng/L (236 pmol/L)**, refer **urgently** for specialist assessment and echocardiography **to be seen within 2 weeks**.

• If the NT-pro-BNP level is **between 400–2000 ng/L (47–236 pmol/L)**, refer for specialist assessment and echocardiography **to be seen within 6 weeks**.

• If NT-pro-BNP is **less than 400 ng/L (47 pmol/L)**, be aware that a diagnosis of heart failure is less likely. Consider **discussion with your local heart failure specialist** if heart failure still suspected.

ECHO

Natriuretic peptides may aid in establishing a working diagnosis in patients suspected of HF, but echocardiography remains the optimal choice for diagnosing HF. Therefore, referral for an ECHO is important and a specialist referral will not be accepted without one.

However, we know that ECHO waiting times are hugely variable and the pandemic has had a greater impact on this.

Consider:

- **utilising community diagnostic centres for obtaining the ECHO**
- **tapping into primary care GPs within your PCN that have a specialist interest in HF and may be able to utilise and perform ECHO**
- **having point of care ultrasound within your PCN so that ECHOs can be obtained quickly.**

ECG

The electrocardiogram (ECG) at rest is a non-invasive investigation that is recommended in the initial evaluation of patients with heart failure. This is because the ECG is crucial in the detection of many abnormalities that may either cause or worsen HF. Again, specialist referrals may not be accepted without one.

- **Consider having ECG availability in your practice, or at least your PCN.**
- **Utilise advice and guidance for interpretation of ECGs.**
- **Utilise community diagnostic hubs to obtain ECGs.**

Breathlessness Clinics

If a patient is breathless, always consider heart failure. However, we know that diagnosis and symptom control can be challenging.

- **Always follow the [breathlessness pathway](#).**
- **Research and obtain any local pathways for practice staff to utilise**
- **Refer to any breathlessness clinics**
- **Consider commencing a breathlessness clinic for your PCN utilising appropriate workforce which may include GPs with a specialist interest in breathlessness and physios, respiratory nurses and physios for pharmacological and non-pharmacological management**

Principles of heart failure management

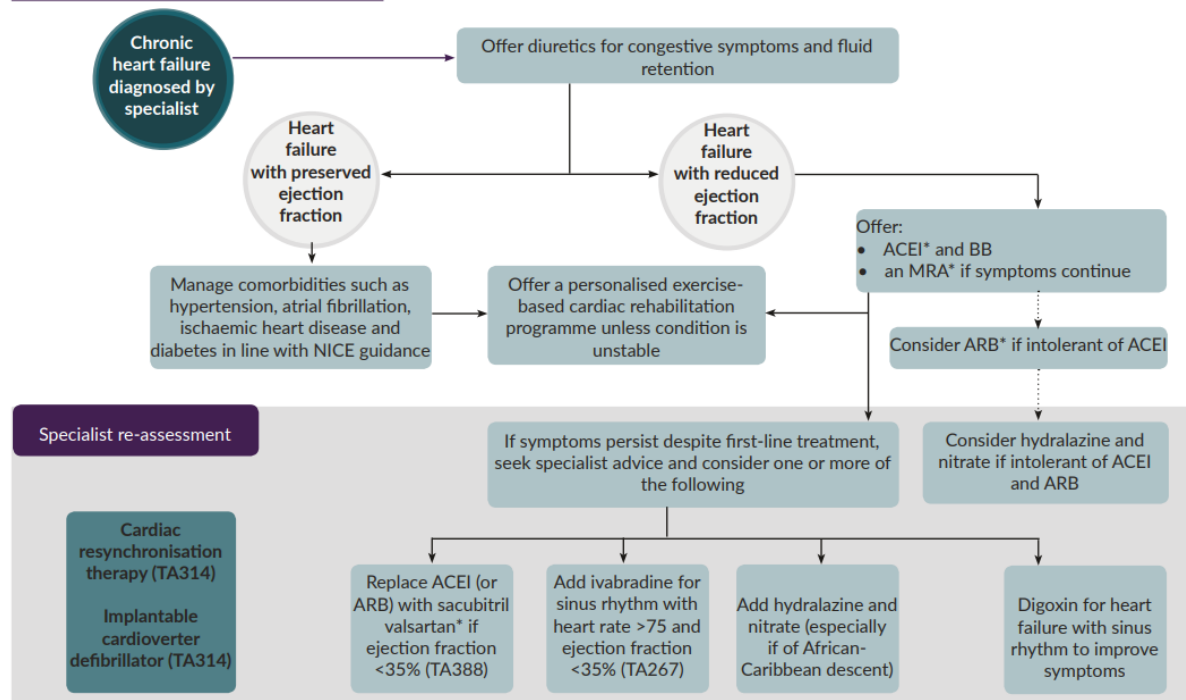
Once a patient has been diagnosed
Refer to the heart failure specialist team
Commence initial therapy according to [NICE](#) guidance

The HF specialist team will then offer guidance and commence up titration of the medicines
Ensure you have received a plan from the specialist team

Continue up titration if necessary, according to NICE guidance
Review the patient regularly

Chronic heart failure: management

NICE National Institute for Health and Care Excellence



To access the image, [click here](#)

Management of HFrEF – The 4 pillars

Within your review of HF patients, the ultimate aim should be uptitration of the evidence-based medications, commonly known as the 4 pillars.

NICE and ESC recommend:

- **ACE-I or ARB (examples being Ramipril or Losartan)**
- **Beta Blockers (examples being Bisoprolol)**
- **Mineralocorticoid receptor antagonists (MRAs) (examples being Epleronone or Spironolactone)**
- **SGLT2i (examples being Dapagliflozin or Empagliflozin)**
- **ARNI is also recommended as a replacement for ACE. (Entresto)**
- **Ask the HF specialist team for advice on up titration, and on switching ACE-I to ARNI**
- **Consider joining HF MDTs to discuss patients**

European Society of Cardiology (ESC) (2021) recommendations

Recommendations	Class ^a	Level ^b
An ACE-I is recommended for patients with HFrEF to reduce the risk of HF hospitalization and death. ^{110–113}	I	A
A beta-blocker is recommended for patients with stable HFrEF to reduce the risk of HF hospitalization and death. ^{114–120}	I	A
An MRA is recommended for patients with HFrEF to reduce the risk of HF hospitalization and death. ^{121,122}	I	A
Dapagliflozin or empagliflozin are recommended for patients with HFrEF to reduce the risk of HF hospitalization and death. ^{108,109}	I	A
Sacubitril/valsartan is recommended as a replacement for an ACE-I in patients with HFrEF to reduce the risk of HF hospitalization and death. ¹⁰⁵	I	B

Principles of managing HF with preserved Ejection Fraction (HfpEF)

HFpEF is difficult to diagnose and is prone to over and under diagnosis. The main symptom is breathlessness, but this is non-specific.

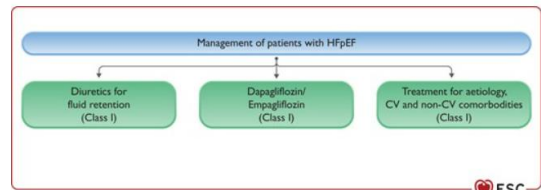
Diagnosis is normally confirmed by :

- Clinical evidence of fluid overload.
- Cardiac investigations showing cardiac insufficiency.
- Elevated NT-BNP level (>2000 pg/ml)
- Response to treatment i.e., there should be at least a short-term improvement with diuretic treatment. If a patient doesn't respond to treatment, consider whether diuretic dose is sufficient or if diagnosis is correct.

The mainstay of treatment is holistic care of the patient, fluid management, rate control of arrhythmias and blood pressure control. Treat fluid overload with diuretics and consider specialist referral. New NICE guidance June 2023 and updated ESC 2023 guidelines also recommend Dapagliflozin. ESC 2023 also recommend Empagliflozin, with NICE also expected to follow, November 2023.

New NICE guidance for HFpEF

- **Dapagliflozin for treating chronic heart failure with preserved or mildly reduced ejection fraction** Technology appraisal guidance [TA902] Published: 21 June 2023
- **1 Recommendations**
- 1.1 Dapagliflozin is recommended, within its marketing authorisation, as an option for treating symptomatic chronic heart failure with preserved or mildly reduced ejection fraction in adults.
- **Why the committee made this recommendation**
- Current standard care for heart failure with preserved or mildly reduced ejection fraction is loop diuretics and treatment for other conditions the person may have. These manage symptoms, but do not reduce hospitalisations for heart failure.
- Clinical trial evidence shows that dapagliflozin plus standard care reduces the combined risk of dying from cardiovascular causes or likelihood of first hospitalisation for heart failure compared with placebo plus standard care. Evidence suggests that dapagliflozin could reduce the chance of dying from cardiovascular or other causes.
- The cost-effectiveness estimates are below what NICE considers an acceptable use of NHS resources So, dapagliflozin is recommended.



Recommendation Table 2 Recommendation for the treatment of patients with symptomatic heart failure with preserved ejection fraction

Recommendation	Class ^a	Level ^b
An SGLT2 inhibitor (dapagliflozin or empagliflozin) is recommended in patients with HFpEF to reduce the risk of HF hospitalization or CV death. ^{c, d, e}	I	A

CV, cardiovascular; HF, heart failure; HFpEF, heart failure with preserved ejection fraction; SGLT2, sodium-glucose co-transporter 2.

^aClass of recommendation.

^bLevel of evidence.

^cThis recommendation is based on the reduction of the primary composite endpoint used in the EMPEROR-Preserved and DELIVER trials and in a meta-analysis. However, it should be noted that there was a significant reduction only in HF hospitalizations and no reduction in CV death.

How can we support heart failure patients to self-manage their condition?

According to the [European Society of Cardiology Guidelines](#) for the diagnosis and treatment of acute and chronic heart failure, self-management is integral to achieving best patient outcomes: to reduce mortality and improve quality of life.

With heart failure patients, self-management can be challenging due to the unpredictable nature of the disease, but the key recommendations that aid in reducing burden on the health care system and improving patients' quality of life are self-management strategies such as:

Chronic heart failure patients should:

- Monitor and identify changes in symptoms (e.g. daily weighing)
- Manage symptom changes (e.g. > 2 kg over 3 days) by adapting behaviour (e.g. see their primary care physician)
- Adhere to medication, diet and exercise regimens
- Restrict sodium, fat, cholesterol, alcohol. Limit fluid intake to (1.5–2 l/day)
- Abstain from cigarette smoking
- Report mental health disturbance (e.g. depression, anxiety) to their healthcare professional

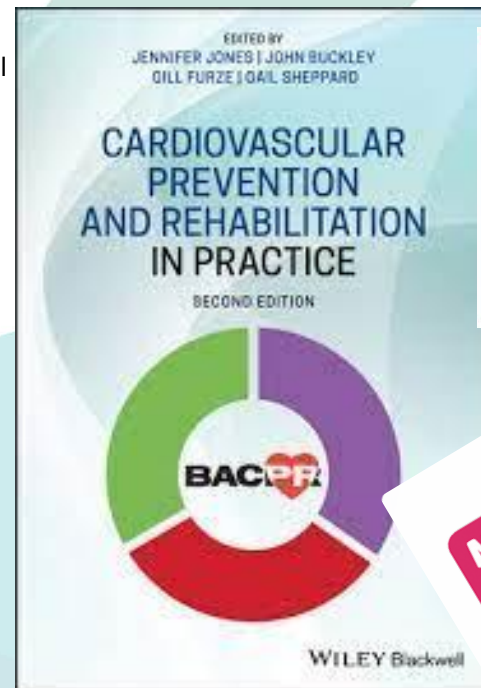
Self-care enables reduced bad days, improved good days, reduced hospital admissions, improved symptoms, improved prognosis.

Interventions and tools that aid self-management

- **Cardiac Rehabilitation** is recommended by NICE as an intervention that can aid heart failure patients with self-management for lifestyle advice as well as improving symptom control. Discuss with your local cardiac rehabilitation team to discuss how you can refer patients into their service

To find local cardiac rehabilitation centre and contact details: [Cardiac Rehabilitation \(cardiac-rehabilitation.net\)](https://www.cardiac-rehabilitation.net)

- There are many charities that provide excellent **patient information** and booklets that can aid patient in self- management
- ✓ Pumping Marvellous [Home - Pumping Marvellous](#)
- ✓ British Heart Foundation [Information for those affected by heart and circulatory diseases - BHF](#)
- ✓ Heart Failure Matters [What Can You Do to Manage Heart Conditions? \(heartfailurematters.org\)](https://www.heartfailurematters.org)






Innovative ways of working to promote self-management – Virtual Monitoring

Virtual Monitoring can reduce face to face contacts. Some patients have actively demonstrated effective self-management via virtual/digital use of clinical assessment devices.

The devices enable patients to highlight when they may be deteriorating or provide them with confidence during evidence-based medication therapy titration.

The **HF@Home** project has been implemented to develop and test approaches using remote monitoring and education, to better support people with heart failure in the community. Several primary care networks are testing this approach to aid in up titration of medications as well as to support patients to self-manage. [NHS England » Managing heart failure @home](#)

Speak to your local ICS remote monitoring lead to discuss how they can support you in implementing this for your PCN.

Risk factor monitoring	Medication adherence	Symptom monitoring
<ul style="list-style-type: none"> • Blood pressure • Smoking • Diet • Weight 	<ul style="list-style-type: none"> • Medication tracking • Smart pillbox 	<ul style="list-style-type: none"> • Home electrocardiogram • Pulse oximeter • Pulmonary artery pressure monitoring 

Despite recent advancements in evidence-based disease modifying therapies, heart failure remains a condition with poor survival outcomes, with 50% of all patients diagnosed with HF expected to die within 5 years, with older patients at increased risk of death.

In primary care, it is important to recognise the signs that patients may be approaching the end of their life. The most common symptoms being:

- pain
- breathlessness on minimal exertion or at rest
- persistent cough
- fatigue
- limited physical activity
- depression and anxiety
- constipation
- loss of appetite and nausea
- oedema
- insomnia
- cognitive impairment

New [NICE guidance](#) is available on how to address patient needs

Addressing palliative and end of life care needs for people living with heart failure: a revised framework for integrated care systems

Document first published: 29 August 2023
Page updated: 29 August 2023
Topic: End of life care, Heart disease, Integrated care
Publication type: Guidance

This document updates 'End of life care in heart failure; a framework for implementation' (2014). Its purpose is to raise awareness of the supportive, palliative and end of life care needs of people living or dying with progressive heart failure, to help in commissioning services to meet their needs. It covers care for adults and refers to anyone aged 18 or over.

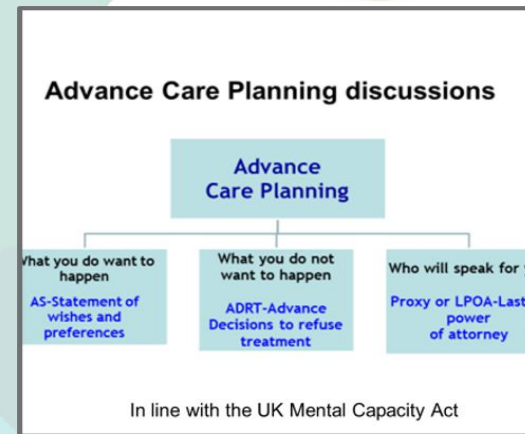
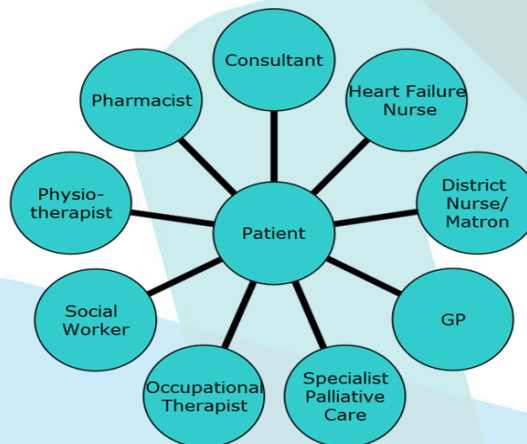


Where can you get further support to aid palliative care

If it is now thought your patient is reaching end of life, it is important to involve as many multi-disciplinary members as possible.

Palliative care teams, community nursing teams, occupational therapists and physios can all aid patients to improve the quality of the last few years, months or days of their life.

- Contact your local hospice to see if they provide support for heart failure patients
- Implement advanced care planning [Gold Standard Framework - Advance Care Planning \(goldstandardsframework.org.uk\)](https://goldstandardsframework.org.uk)
- Discuss RESPECT form completion [ReSPECT for healthcare professionals | Resuscitation Council UK](#)
- If the patient has a automatic implantable cardioverter defibrillator (AICD), this may need deactivating, so contact local centre to arrange this. [ICD deactivation at the end life: Principles and practice - BHF](#)
- Symptom control should be the key priority. Discuss with heart failure specialist team, palliative care teams and pharmacy colleagues to ensure symptom relief is managed effectively.



Where can I read more to aid improvement in heart failure

DATA

Understanding what the current status of heart failure is in your practice is really important.

The HIWM are happy to help you with this so please do contact us, however you can access data via fingertips. [Public health profiles - OHID \(phe.org.uk\)](#)

The HIWM collaborated with the regional Cardiac Pathway Improvement Programme (CPIP) team to produce a [State of the Region report](#) on heart failure within the Midlands.

POLICY

- BHF Report - [Heart Failure report - BHF](#)
- BSH pathway [British Society for Heart Failure \(bshpathway.org.uk\)](#)
- OAHSN toolkit [Excellence-in-HF-toolkit.pdf \(oxfordahsn.org\)](#)
- GIRFT report - [Cardiology - Getting It Right First Time - GIRFT](#)
- Best Practice Statement The use of compression therapy for peripheral oedema: considerations in people with heart failure - [ESS23 BPS Heart-failure WUK-web-1.pdf \(wounds-uk.com\)](#)

EDUCATION

- HIWM education sessions are available on request.
- HEE HF education modules [Heart Failure and Heart Valve Disease – elearning for healthcare \(e-lfh.org.uk\)](#)

Further Resources

ACE-I – Angiotensin converting enzyme inhibitor

AF – Atrial Fibrillation

AICD – Automatic Implantable cardioverter defibrillator

ARB –Angiotensin II receptor blockers

ARNI Angiotensin receptor/neprilysin inhibitor

BHF – British Heart Foundation

BSH – British Society of Heart Failure

CVD – Cardiovascular Disease

ECG - Electrocardiogram

ECHO – Echocardiography

ESC – European Society of Cardiology

HIWM – Health Innovation West Midlands

HF – Heart Failure

HFrEF – Heart Failure with Reduced Ejection Fraction

HFpEF – Heart Failure with Preserved Ejection Fraction

ICS – Integrated Care System

LVEF – Left Ventricular Ejection Fraction

LVSD – Left Ventricular Systolic Dysfunction

MDT – Multidisciplinary Team

MRA -Mineralocorticoid receptor antagonists

NICE – National Institute of Clinical Excellence

NTproBNP - N-terminal pro b-type natriuretic peptide

NYHA – New York Heart Association

OAHSN – Oxford Academic Health Science Network

PCN – Primary Care Network

QOF – Quality Outcomes Framework

RN – Registered Nurse



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If you want further information or support to implement heart failure quality improvement projects, please do contact the CVD team via Pip Richards philippa.richards@healthinnovationwm.org

