Reframing the Role and Impact of Pharmacy in Heart Failure Care

eLearning Module

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This material is intended for pharmacists with an interest in cardiovascular disease.

Welcome

Welcome to the Heart Failure (HF) eLearning module for pharmacists and pharmacy team members.

Reframing the Role and Impact of Pharmacy in Heart Failure Care

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Learning objectives

Upon successful completion of this continuing education learning module, you will be able to:

- Understand heart failure and the impact of the disease on global and individual health
- Understand the classification and staging of heart failure
- Identify the risk factors for developing heart failure
- Recognise the symptoms of heart failure
- Describe guideline-recommended practice in relation to both the pharmacological and nonpharmacological management of the condition
- Recognise the importance of the role pharmacists play in symptom management of patients with heart failure
- Provide advice to patients with heart failure on lifestyle changes that may help alleviate symptoms
- Identify how to use the Heart Failure Pharmacy Toolkit in your practice to enhance patient care

Why Focus on Heart Failure?

An invisible disease

Heart failure (HF) is a condition where the heart cannot pump enough blood and oxygen to support other organs in the body.[1] It is marked by considerable morbidity and mortality, diminished functional capacity and quality of life (QoL), and substantial economic costs.[2] HF typically worsens over time and there is no cure.[3]

Some typical symptoms of HF, such as oedema, fatigue, and dyspnoea, are not specific to HF.[4] Thus, HF is frequently misdiagnosed, with the most common cause for misdiagnosis being chronic obstructive pulmonary disease (COPD).[5]

This is why HF is often referred to as an "invisible disease."

As well, HF is linked with many other chronic diseases, including ischaemic heart disease (IHD), hypertension, diabetes, chronic kidney disease, atrial fibrillation, and obesity, either through shared risk factors or by one disease increasing the risk or severity of the other.[1,2,6]

1. Centers for Disease Control and Prevention (CDC). About heart failure. Available at: https://www.cdc.gov/heart-disease/about/heart-failure.html. Accessed August 2024.
2. Savarese G et al. *Cardiovasc Res*. 2022;118:3272-3287.
3. British Heart Foundation (BHF). Heart failure. Available at: https://www.bhf.org.uk/informationsupport/conditions/heart-failure. Accessed August 2024.
4. Government of British Columbia. Heart failure - diagnosis and management. Available at: https://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/bc-guidelines/heart-failure-chronic. Accessed August 2024.
5. Wong CW et al. *J Card Fail*. 2021;27(9):925-933.
6. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.
7. Alpert CM et al. *Heart Fail Rev*. 2017;22(1):25-39.
8. Anderson S, Marrs JC. *Adv Ther*. 2018;35:311-323.
9. Schulz M et al. *Eur J Heart Fail*. 2019;21:1012-1021.

Symptoms underreported

- Patients may fail to recognise their symptoms and frequently normalise daily fluctuations, meaning symptoms are ignored long enough to become severe[7]

Risk of hospitalisation and readmission

- Hospitalisations due to HF represent 1%-2% of all hospital admissions in the Western world[2]
- Approximately 30%-40% of HF patients have a history of hospitalisation for HF[2]
- 50% of patients are re-admitted within 1 year of their initial diagnosis of HF[2]
- Incident and recurrent hospitalisations due to HF are linked to increased risk of mortality[2]

Pharmacist interventions improve outcomes

- In a randomised, controlled trial, patients receiving pharmacist intervention experienced lower all-cause mortality and nonfatal HF events compared to those receiving usual follow-up care[8]
- Another study found that cognitive HF services provided by community pharmacists were well received by patients and improved their understanding of the condition and medications, medication adherence, and self-care[8]
- Evidence has also shown that pharmacy care can safely improve adherence to HF medications and QoL[9]

Emphasising holistic symptom management in HF care is critical. Given their accessibility and expertise,
PHARMACISTS PLAY A PIVOTAL ROLE!

Global burden of HF

Prevalence

Prevalence 1%-3% in general audit population

Overall prevalence ↑

Prevalence in HFrEF ↔

Prevalence in HFpEF ↑

Incidence

Incidence 1-20 cases per 1,000 person-years or per 1,000 population

Incidence stable/ declining ↔

Incidence in HFrEF ↓

Incidence in HFpEF ↘

Mortality

Mortality remains high

30-day Mortality **~2%-3%**

1-year Mortality **~15%-30%**

3-year Mortality **~30%-50%**

5-year Mortality **~50%-75%**

CVD HFrEF ↓ **CVD HFpEF** ↑

Costs

Annual health care costs up to €25,500 per year

Increasing due to major demographic changes (>65 years)

Main cost drivers:

- Direct costs (~70%)
- Non-CVD comorbidities
- Invasive procedures
- Medications/ Diagnostics
- Outpatient visits

Adapted from Savarese G et al.[1]

HF has been defined as a **global pandemic**. In 2017, nearly 64 million people suffered from HF worldwide.[1]

While the incidence of HF has stabilised and appears to be declining in some countries,[1] the **prevalence is increasing**, due to[1]:

- an ageing population and longer life expectancy
- improved survival following diagnosis
- availability of life-saving evidence-based therapies

Most of the economic costs are **direct costs** and are linked to[1]:

- inpatient care
- hospitalisations and readmissions
- non-CVD comorbidities

Based on major demographic changes and the overall increasing prevalence of HF, direct (and indirect) costs are expected to significantly increase, especially in patients older than 65.[1]

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CVD, cardiovascular disease
HFpEF, heart failure with preserved ejection fraction
HFrEF, heart failure with reduced ejection fraction

1. Savarese G et al. *Cardiovasc Res*. 2022;118:3272-3287.

ACT NOW

Some of your patients with HF may not yet fully appreciate the seriousness of their disease. You and your team members can play a vital role in improving patients' knowledge about HF and the possible consequences of not doing all they can to manage their disease.

- Provide easy-to-read, accurate, and up-to-date HF educational materials.
- Explain key terms and tests that a patient may need, using patient-friendly and accessible language.
- Educate on the impact HF can have on daily activities and QoL.
- Guide patients to primary care services as needed to reduce the risk hospitalisation and readmission.

QoL, quality of life

Practice

Reflection

Practice reflection

Reflecting on your own practice, take a moment to answer the question below.

Do you speak to patients about their HF risk and/or management?

A Yes. I regularly and consistently discuss HF risk and/or management with my patients at a level I'm happy with.

B Yes. I occasionally discuss HF risk and/or management with my patients, but I would like to do more to help them.

C No. Discussing and managing HF is rarely part of my practice.

D No. I am unsure of where to start.

NEXT PAGE +

Feedback

While most pharmacists and pharmacy team members would like to answer **A**, many may not. They may only occasionally speak to their patients with HF and/or they may not know where to start.

A toolkit that is designed to enhance patient interactions and minimise the burden on workload and workflow would help pharmacies start the HF conversation and make their moments spent with HF patients matter.

The good news is that there is such a toolkit for community pharmacy. It is known as the **Heart Failure Pharmacy Toolkit**.

This eLearning module is one component of the Heart Failure Pharmacy Toolkit.

Let's learn more!

Understanding Heart Failure

What is heart failure (HF)?

Heart failure (HF) is a chronic, progressive condition[1] characterised by the inability of the heart to pump blood effectively to meet the body's needs for blood and oxygen. Basically, the heart cannot keep up with the workload required by the body.[1]

Left ventricular ejection fraction (LVEF) is often used to describe HF. LVEF is often utilised in the diagnosis and evaluation of HF.[3,4]

LVEF represents the percentage or fraction of blood volume expelled from the left ventricle with each beat, ultimately measuring left ventricular pumping function.[3]

$$EF^{5} = \frac{\text{amount of blood pumped out}}{\text{amount of blood in the heart chamber}}$$

$$EF^{2} = \frac{\text{stroke volume}}{\text{end-diastolic volume}}$$

EF, ejection fraction

1. Canadian Cardiovascular Society (CCS). Heart failure. Available at: https://ccs.ca/heart-failure/. Access August 2024.
2. American Heart Association (AHA). What is heart failure? 2023. Available at: https://www.heart.org/en/health-topics/heart-failure/what-is-heart-failure. Accessed August 2024.
3. Northern Ireland Centre for Pharmacy Learning and Development (NICPLD). Heart failure: terminology. Available at: https://www.nicpld.org/online/heart_failure/#m1-symptoms_of_heart_failure. Accessed August 2024.
4. American Heart Association (AHA). Ejection fraction heart failure measurement. Available at: https://www.heart.org/en/health-topics/heart-failure/diagnosing-heart-failure/ejection-fraction-heart-failure-measurement. Accessed August 2024.
5. American Heart Association (AHA). HF and your ejection fraction explained. Available at: https://www.heart.org/-/media/Files/Health-Topics/Heart-Failure/HF-and-Your-Ejection-Fraction-Explained.pdf. Accessed August 2024.
6. McDonagh TA et al. *Eur Heart J*. 2021;42(36):3599-3726.

Normally, approximately 50%-70% of the blood in the heart is pumped out during each contraction.[4,5]

In patients with impaired contraction and emptying of the left ventricle (systolic dysfunction), stroke volume may be maintained by a rise in end-diastolic volume as a result of left ventricular dilation.[3]

The heart then expels a reduced fraction of a larger volume.[3]

The severity of systolic dysfunction correlates with a diminished LVEF, making **LVEF a crucial prognostic marker** for heart failure.[3]

It is important to note that having a normal LVEF **does not** mean a patient does not have or cannot develop HF.[4]

If the heart muscle becomes thick and stiff, then the ventricle may hold a smaller than usual volume of blood. So, the heart might still have an ejection fraction that falls in the normal range because the heart is pumping out a normal percentage of the blood that enters it. However, the total amount of blood being pumped is not enough to meet the body's needs.[4]

When a patient has signs and symptoms of HF and evidence of cardiac structural and/or functional abnormalities, but still has an LVEF ≥50%, it is known as HF with preserved ejection fraction (HFpEF).[6]

The classification of HF will be discussed on slide 17.

Universal definition of HF

Symptoms and/or signs of HF caused by a structural and/or functional cardiac abnormality

corroborated by *at least one* of the following

Elevated natriuretic peptide levels

or

Objective evidence of cardiogenic pulmonary or systemic congestion

Structural heart disease

- left ventricular hypertrophy
- left atrial enlargement
- valvular heart disease

Abnormal cardiac function

- reduced left or right ventricular systolic function
- increased filling pressures
- abnormal diastolic dysfunction

Adapted from Bozkurt B et al.[1]

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With the **increasing burden of HF** and evidence highlighting **deficiencies in the use of guideline-directed medical therapy (GDMT)** for HF, there was a need for a universal definition.[2]

In 2020, a committee comprised of experts from 14 countries and 6 continents created a consensus document resulting in such a definition.[2]

The new universal HF definition is[1,2]:

- simple
- comprehensive
- globally applicable
- sensitive and specific
- clinically relevant (prognostic and therapeutic validity and utility)

The new universal HF definition is also practical enough to form the basis of new classifications and disease stages.[1]

1. Bozkurt B et al. *Eur J Heart Fail*. 2021;23:352-380.

2. Gibson G et al. American College of Cardiology (ACC). Universal definition and classification of heart failure: a step in the right direction from failure to function. Available at: https://www.acc.org/latest-in-cardiology/articles/2021/07/12/12/31/universal-definition-and-classification-of-heart-failure. Accessed August 2024.

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- Discuss with patients that while the term “heart failure” sounds like their heart is no longer working at all, it actually means that their heart isn’t pumping as well as it should.[1]

  Advise patients that “heart failure” isn’t the same as “heart attack.” While “heart failure” may lead to “heart attack,” among other complications, the heart is still working when you have “heart failure.”[2]

  Explain that “heart failure,” “heart attack,” and “coronary artery disease” are all types of heart disease.[2]

1. American Heart Association (AHA). What is heart failure? Available at: https://www.heart.org/en/health-topics/heart-failure/what-is-heart-failure. Accessed August 2024.
2. Gurarie M. verywellhealth. Heart failure facts and statistics: what you need to know. Available at: https://www.verywellhealth.com/facts-about-heart-failure-6274444. Accessed August 2024.

Common stages and classification of HF

HF has been commonly staged and classified using the ACCF/AHA stages and NYHA functional classification.[1]

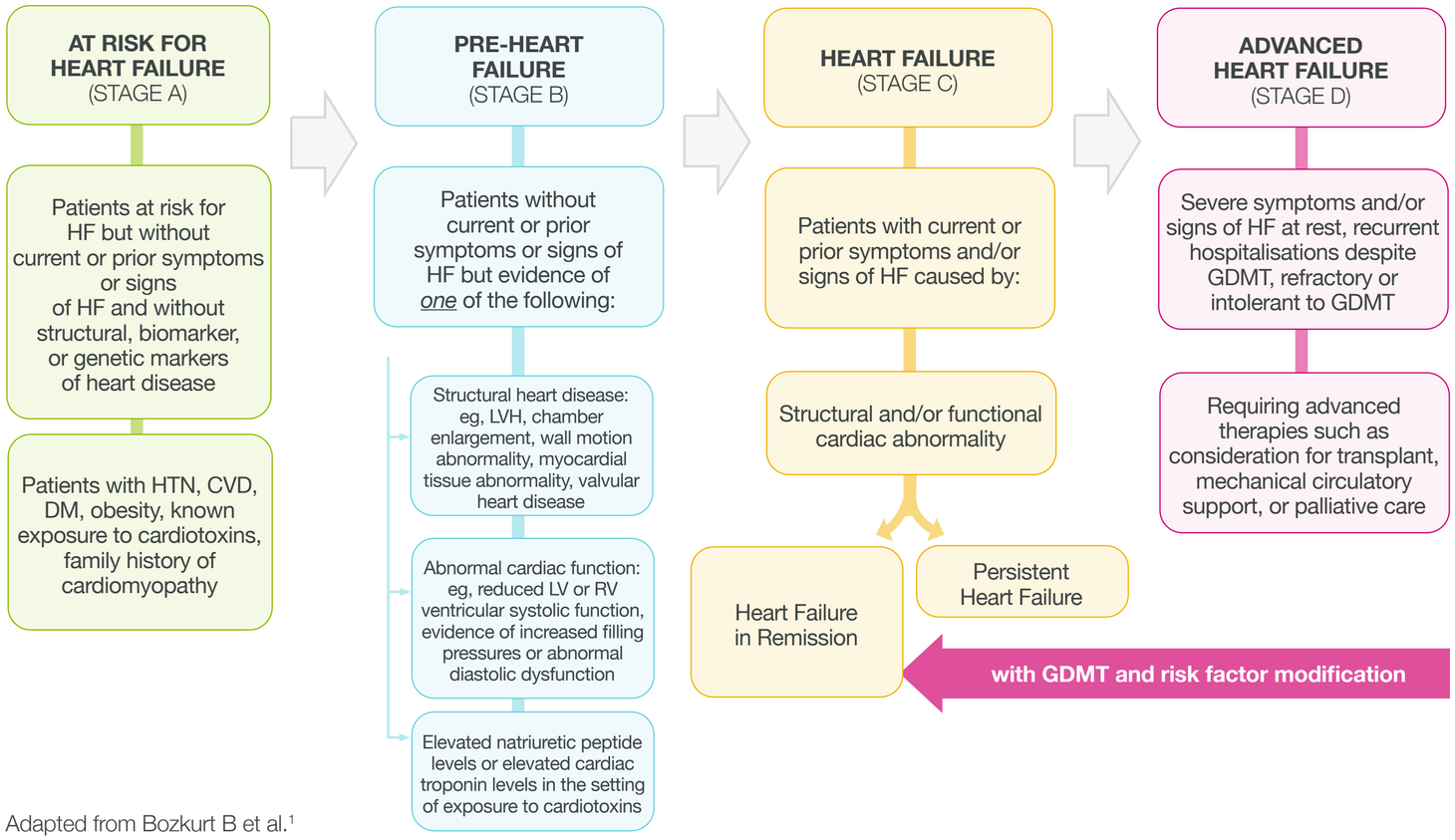
	ACCF/AHA stages of HF		NYHA functional classification	
At risk of HF	**A**	At high risk for HF but without structural heart disease or symptoms of HF	None	
	B	Structural heart disease but without signs or symptoms of HF	I	No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF
Existing HF			I	No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF
	C	Structural heart disease with prior or current symptoms of HF	II	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in symptoms of HF
			III	Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes symptoms of HF
			IV	Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest
	D	Refractory HF requiring specialised interventions	IV	Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest

The **ACCF/AHA** stages progressively worsen such that patients cannot revert to an earlier stage of HF severity.
In contrast, the **NYHA** functional classification for HF can move in either direction to demonstrate clinical worsening or improvements.[1]

ACCF, American College of Cardiology Foundation
AHA, American Heart Association
NYHA, New York Heart Association

1. Yancy CW et al. *Circulation*. 2013;128:e240-e327.

Revised stages of HF



Adapted from Bozkurt B et al.[1]

With the new universal HF definition, the stages of HF were also revised to emphasise the **presence (or absence) of symptoms** as key in the characterisation of HF progression and severity.[2]

Classifying HF by stage (stages A to D) will help HCPs to communicate with patients in a more practical manner and provide key terms to allow for **effective shared decision-making and care**.[2]

It is hoped that HCPs and patients will view **HF as existing on a cardiovascular health continuum** to help focus treatment and/or prevention depending on the stage.[2]

In particular, the pre-HF stage (stage B) provides opportunities for[2]:

- educating on disease prevention
- addressing key risk factors
- preventing transition to symptomatic phases wherein heart failure is “active”

The revised staging also introduced new terminology[2]:

- **“persistent HF”** instead of “stable HF” because even if HF is stable, there are still opportunities to optimise therapies that prevent further worsening or adverse outcomes
- **“HF in remission”** instead of “recovered HF,” as HF is known to frequently relapse

CVD, cardiovascular disease
DM, diabetes mellitus
GDMT, guideline-directed medical therapy
HCP, healthcare professional
HTN, hypertension
LV, left ventricular
LVH, left ventricular hypertrophy
RV, right ventricular

1. Bozkurt B et al. *Eur J Heart Fail*. 2021;23:352-380.
2. Gibson G et al. American College of Cardiology (ACC). Universal definition and classification of heart failure: a step in the right direction from failure to function. Available at: https://www.acc.org/latest-in-cardiology/articles/2021/07/12/12/31/universal-definition-and-classification-of-heart-failure. Accessed August 2024.

Revised classification of HF

HF with reduced EF (HFrEF):

- HF with LVEF ≤40%

HF with mildly reduced EF (HFmrEF):

- HF with LVEF 41%-49%

HF with preserved EF (HFpEF):

- HF with LVEF ≥50%

HF with improved EF (HFimpEF):

- HF with a baseline LVEF ≤40%, a ≥10 point increase from baseline LVEF, and a second measurement of LVEF >40%

Adapted from Bozkurt B et al.[1]

The 2020 consensus document also revised the classification of HF based on LVEF to refine naming. Four LVEF categories were created to define groups where treatment differs. This revised classification allows targeting of GDMT according to LVEF.[1,2]

Most notable in the revised classification is the new subcategory **"HF with improved EF"** (HFimpEF). It describes HF patients whose EF has improved by 10% to >40% compared to a baseline measurement. This helps to distinguish patients with previous severely reduced EF from those with only mild EF reductions at baseline and provides a sense of disease trajectory.[2] This is important because evidence has shown that patients with improved EF may still be at risk of recurrent ventricular dysfunction and decompensation, particularly if GDMT is stopped.[2]

EF, ejection fraction
GDMT, guideline-directed medical therapy
HFimpEF, heart failure with improved ejection fraction
HFmrEF, heart failure with midrange ejection fraction
HFrEF, heart failure with reduced ejection fraction
HFpEF, heart failure with preserved ejection fraction
LVEF, left ventricular ejection fraction

1. Bozkurt B et al. *Eur J Heart Fail*. 2021;23:352-380.

2. Gibson G et al. American College of Cardiology (ACC). Universal definition and classification of heart failure: a step in the right direction from failure to function. Available at: https://www.acc.org/latest-in-cardiology/articles/2021/07/12/12/31/universal-definition-and-classification-of-heart-failure. Accessed August 2024.

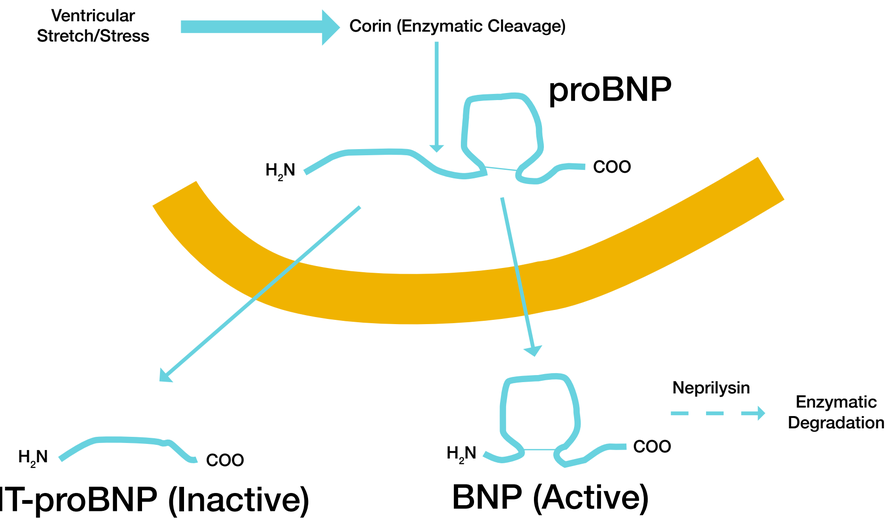
Diagnosis of HF

Due to the nonspecific nature of HF symptoms, various tests are necessary to diagnose the condition[1,2]:

1. Natriuretic peptides (BNP and NT-proBNP)
2. 12-lead electrocardiogram (ECG)
3. Chest x-ray
4. Echocardiogram
5. Full blood count
6. Blood chemistry (eg, electrolytes, creatinine, liver enzymes, cholesterol, and HbA1c)
7. Thyroid function tests
8. Peak flow/spirometry
9. Urinalysis

Tests to determine LVEF are important when attempting to diagnosis HF. However, HF is not assessed by LVEF in isolation. Various cardiac structural and functional parameters and diagnostic modalities can be complementary when diagnosing HF. Other cardiac features are important for diagnosis, classification, aetiology, and/or prognosis.[3]

Tests to confirm abnormal levels of blood biomarkers, namely natriuretic peptides, can help to diagnosis and monitor HF.[3,4]



Adapted from Tran NK et al.[4]

As shown above, following ventricular stretching and/or stress, the enzyme corin cleaves proBNP to produce BNP and NT-proBNP. Both are released into the bloodstream. BNP is the active form. NT-proBNP is the inactive metabolite and is renally cleared. BNP promotes sodium excretion in the urine (natriuresis). Elimination of BNP is by the enzyme neprilysin. Natriuretic peptides are indicators of cardiac stress.[4]

B-type natriuretic peptide (BNP) is the most common natriuretic peptide used for detecting and monitoring HF. However, BNP carries several limitations, including short half-life and it may not be appropriate for HF monitoring in patients receiving sacubitril/valsartan therapy. Thus, **N-terminal pro b-type natriuretic peptide (NT-proBNP)** is also used.[4]

However, it should be noted that there are many causes of elevated natriuretic peptides, both CV and non-CV, that might reduce their diagnostic accuracy – which is why natriuretic peptides are not used alone to diagnosis HF.[2]

CV, cardiovascular
HbA1c, haemoglobin A1C
LVEF, left ventricular ejection fraction

1. Northern Ireland Centre for Pharmacy Learning and Development (NICPLD). Heart Failure: investigations. Available at: https://www.nicpld.org/online/heart_failure/#m1-management-symptoms. Accessed August 2024.
2. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.
3. Bozkurt B et al. *Eur J Heart Fail*. 2021;23:352-380.
4. Tran NK et al. Next generation biomarkers of heart failure: moving beyond natriuretic peptides. Available at: https://health.ucdavis.edu/blog/lab-best-practice/next-generation-biomarkers-of-heart-failure-moving-beyond-natriuretic-peptides/2018/02. Accessed August 2024.

HF
risk factors

Traditional cardiometabolic factors account for a large proportion of HF risk.[1]

Some common HF risk factors are listed below.[1-5]

Please note this is not an exhaustive list.

- **Ischaemic heart disease (IHD)** – cause of HF in about 40% of the global HF population; more likely to be the cause of HFrEF and HFmrEF rather than HFpEF; predominant HF risk factor in western-type and developed countries
- **Hypertension** – cause of HF in about 15% of the global HF population; predominant HF risk factor in western-type and developed countries
- **Previous heart attack** that has done some damage to the heart muscle
- **Cardiomyopathy** – Chagas cardiomyopathy (caused by the protozoan *Trypanosoma cruzi*) remains the most common cause of non-ischaemic HF in South America
- **Atrial fibrillation** – can cause or make HF worse
- **Valvular disease** – aortic stenosis, the most common valvular disease globally, may cause or worsen HF; rheumatic heart disease (RHD) is still a major HF risk factor in sub-Saharan and low-income countries
- **Diabetes** – highly prevalent in patients with HFrEF and HFpEF
- **Certain medications** – eg, anthracyclines, trastuzumab, VEGF inhibitors, proteasome inhibitors
- **Sleep disorders** – eg, sleep apnoea
- **Obesity**
- **Smoking**
- Excessive **alcohol** or **drug** consumption

HFmrEF, heart failure with mildly reduced ejection fraction
HFpEF, heart failure with preserved ejection fraction
HFrEF, heart failure with reduced ejection fraction
VEGF, vascular endothelial growth factor

1. Tsao C et al. *Circulation*. 2022;145:e153-e639.
2. Savarese G et al. *Cardiovasc Res*. 2022;118:3272-3287.
3. McDonagh TA et al. *Eur Heart J*. 2021;42(36):3599-3726.
4. American Heart Association (AHA). What is heart failure? 2022. Available at: https://www.heart.org/-/media/Files/Health-Topics/Answers-by-Heart/What-Is-Heart-Failure.pdf. Accessed August 2024.
5. American Heart Association (AHA). Risks for heart failure. Available at: https://www.heart.org/en/health-topics/heart-failure/causes-and-risks-for-heart-failure. Accessed August 2024.

Signs and symptoms of HF

Many of the symptoms and signs of HF are non-discriminating and are of limited diagnostic value on their own. However, once a diagnosis has been made, symptoms and signs are useful in **monitoring the response to treatment and ongoing stability.**[1]

Please note this is not an exhaustive list.

Signs (*what you may observe or measure in a patient*)[2]

More specific

- Elevated jugular venous pressure
- Third heart sound
- Cardiomegaly, laterally displaced apical impulse
- Hepatojugular reflux
- Cheyne-Stokes respiration in advanced heart failure

Less specific

- Peripheral oedema (ankle, sacral, scrotal)
- Unintentional weight gain (>2 kg/week)
- Weight loss with muscle wasting and cachexia (in advanced HF)
- Cardiac murmur
- Tachycardia, irregular pulse
- Tachypnoea
- Enlarged liver / ascites
- Cold extremities

Symptoms (*what the patient experiences and reports*)[2]

Typical

- Breathlessness
- Orthopnoea
- Paroxysmal nocturnal dyspnoea
- Reduced exercise tolerance
- Fatigue, tiredness
- Ankle swelling
- Inability to exercise
- Swelling of parts of the body other than ankles

Less typical

- Nocturnal cough
- Wheezing
- Bloated feeling
- Feeling full after meals
- Loss of appetite
- Decline in cognitive function, confusion (especially in the elderly)
- Depression
- Dizziness

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1. Northern Ireland Centre for Pharmacy Learning and Development (NICPLD). Heart failure: symptoms and signs of heart failure. Available at: https://www.nicpld.org/online/heart_failure/#m1-symptoms_of_heart_failure. Accessed August 2024.
2. Bozkurt B et al. *Eur J Heart Fail*. 2021;23:352-380.

ACT NOW

As a pharmacist, your daily patient interactions uniquely position you to be a **frontline advocate** in raising awareness about HF risk factors and HF symptom management, especially among individuals with comorbidities.

- **Refill conversations:** When patients come for medication refills, it's an opportunity to engage them in conversations about their health. Discuss how their medications are working and ask about any changes in their health status or their medication use.

- **Medication reviews:** Conduct structured medication reviews when appropriate. During these reviews, you can discuss HF risk factors or any new symptoms they may be experiencing, especially if the patient is on medications that could contribute to HF.

- **Screening programs:** Participate in screening programs, such as blood pressure and cholesterol screening. These can help identify patients at risk of HF. Early identification of these risk factors can play a crucial role in preventing the progression of heart failure and in timely interventions.

Exploring gender disparities in HF

HF tends to occur at an older age in women than in men.[1] Evidence indicates that women prior to menopause may be somewhat protected against the development of CVD when compared with men. This may be related to the fact that the main circulating female hormone, oestrogen, has been shown to be cardioprotective.[2]

In addition, HFpEF is more common in women than in men, and it accounts for at least half the cases of HF in women. Women with HFpEF are less likely to have coronary artery disease and more likely to have hypertension.[1]

Research has found that women face a 20% increased risk of developing heart failure or dying within five years after their first severe heart attack compared with men. It has also been suggested that women may receive less aggressive treatment following a heart attack than men.[3]

HF treatment guidelines should be applied the same to both women and men. Guideline-directed medical therapies (GDMT) show no differences in the overall recommendations for standard medical therapy approaches between women and men.[1]

Did you know?

Women are less likely to be referred for HF specialty care or diagnostic testing, and they undergo fewer procedures including revascularization, implantable cardioverter defibrillators (ICDs), cardiac resynchronisation therapy (CRT), or mechanical circulatory support.[1]

ACT NOW +

CVD, cardiovascular disease

HFpEF, heart failure with preserved ejection fraction

1. Bozkurt B, Khalaf S. *Methodist Debakey Cardiovasc J*. 2017;13(4):216-223.

2. Iorga A et al. *Biol Sex Differ*. 2017;8(1):33.

3. American Heart Association. Women found to be at higher risk for heart failure and heart attack death than men. Available at: https://newsroom.heart.org/news/women-found-to-be-at-higher-risk-for-heart-failure-and-heart-attack-death-than-men. Accessed August 2024.

ACT NOW

If your female patients have questions about hormone replacement therapy (HRT), consider seizing the opportunity to engage in meaningful heart health conversations with women navigating menopause.

- Initiate discussions about the potential benefits and risks associated with HRT and emphasise the importance of lifestyle changes to prevent conditions like HF.

  Examples of conversation starters:

  - *“I noticed you’re starting hormone replacement therapy. It’s important to discuss potential benefits and risks, especially regarding heart health. Have you had a chance to talk about this with a doctor or other healthcare provider?”*
  - *“Menopause brings about various changes that can impact heart health. If it is OK with you, could we take a moment to discuss incorporating lifestyle interventions to support your heart health during this transition?”*

- Offer advice, support, and resources to help answer your patients’ questions and promote healthier lifestyles.

Heart Failure and Comorbidities

Link between HF and chronic diseases

The high burden of comorbidities in HF patients is the rule, not the exception.[4]

Evidence has shown that greater comorbidity burden was associated with higher rates of HF hospitalisation and all-cause mortality after 1.5 years of follow-up.[4]

Thus, focus should not only be on the heart!

Comorbid conditions must be considered and addressed. HF and comorbidities may have the same risk factors, same symptoms, or one disease may increase the risk or severity of the other.[5-7]

CKD, chronic kidney disease
COPD, chronic obstructive pulmonary disease

1. Le Jemtel TH, Padeletti M, Jelic S. *J Am Coll Cardiol*. 2007;49(2):171-180.
2. van de Wouw J et al. *Front Physiol*. 2019;10:1108.
3. Diabetes.co.uk. Heart Failure. Available at: https://www.diabetes.co.uk/diabetes-complications/heart-failure.html. Accessed August 2024.
4. Screever EM et al. *Clin Res Cardiol*. 2023;112:123-133.
5. McDonagh TA et al. *Eur Heart J*. 2021;42(36):3599-3726.
6. Savarese G et al. *Cardiovasc Res*. 2022;118:3272-3287.
7. Government of British Columbia. Heart failure - diagnosis and management. Available at: https://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/bc-guidelines/heart-failure-chronic. Accessed August 2024.

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It has been shown that comorbidities may promote exacerbation of HF, worsen survival, and complicate treatment.[1,2] Thus, management of comorbidities is a key component in the holistic care of patients with HF.

Rather than treating each condition in isolation, consider the patient's overall health status and how their various conditions may interact.

- Recognise the interplay of chronic diseases and other conditions.
- Tailor and personalise medication management, taking each patient's comorbidities and other factors into account.
- Promote lifestyle modifications to ensure optimal outcomes.

1. Screever EM et al. *Clin Res Cardiol*. 2023;112:123-133.
2. Khalid K et al. *Cureus*. 2021;13(8):e17387.

Interconnectivity of HF and chronic diseases

Table 1 | Interconnections HF and coexisting chronic conditions

Condition	Relationship
Hypertension (HTN)	• HTN and HF often coexist, as HTN is a common risk factor for HF[1] • HTN and HF share risk factors, such as smoking, obesity, sedentary lifestyle, and excessive alcohol consumption[1,2] • Uncontrolled HTN contributes to the development and progression of HF[3,4]
Diabetes Mellitus	• HF now being recognised as a common complication of diabetes, with incidence rates increasing[5] • Insulin resistance is prevalent in >60% of patients with HF and new-onset diabetes is common in HF[5] • HF may be the first presenting CV complication in patients with diabetes, and both HFpEF and HFrEF may be present in diabetes[5] • The complex relationship between HF and diabetes involves numerous pathways, including insulin resistance, and inflammation, with a negative impact on myocardial remodeling and heart muscle function[5]
Chronic Kidney Disease (CKD)	• CKD is common in patients with HF[6] • HF is one of the leading causes of hospitalisation, morbidity, and mortality in patients with impaired renal function[7] • Prevalence and mortality of HF increases with worsening renal failure[6,7] • CKD and HF share risk factors, including hypertension and diabetes[7] • HF and CKD have synergistic effects, with the presence of one disease speeding up the progression of the other[7] • CKD and HF have intertwined physiological processes; patients with CKD have a higher risk of HF because the kidneys cannot get rid of fluid effectively; patients with HF have a higher risk of CKD due to reduced blood flow to the kidneys[7,8]
Chronic Obstructive Pulmonary Disease (COPD)	• Prevalence of unrecognised HF is approximately 20% in patients with COPD[6] • HF and COPD share risk factors and pathogenic mechanisms and tend to present with similar signs and symptoms, which can lead to diagnostic and therapeutic challenges for both[9] • COPD is a risk factor for HF and both systolic and diastolic dysfunction of the right and left ventricles are seen in patients with COPD; right HF is related to hypoxic vasoconstriction of lung-induced pulmonary hypertension and eventually right HF will likely cause left HF[10]

CV, cardiovascular

HFpEF, heart failure with preserved ejection fraction

HFrEF, heart failure with reduced ejection fraction

1. McDonagh TA et al. *Eur Heart J*. 2021;42(36):3599-3726.

2. World Health Organization (WHO). Hypertension – Fact sheet. Available at: https://www.who.int/news-room/fact-sheets/detail/hypertension. Accessed August 2024.

3. American Heart Association (AHA). How high blood pressure can lead to heart failure. Available at: https://www.heart.org/en/health-topics/high-blood-pressure/health-threats-from-high-blood-pressure/how-high-blood-pressure-can-lead-to-heart-failure. Accessed August 2024.

4. Mangini S et al. *Einstein (Sao Paulo)*. 2013;11(3):383-391.

5. Pop-Busui R et al. *Diabetes Care*. 2022;45:1670-1690.

6. Savarese G et al. *Cardiovasc Res*. 2022;118:3272-3287.

7. Ryan DK, Banerjee D, Jouhra F. *Eur Card Rev*. 2022;17:e17.

8. National Kidney Foundation (NKF). Heart failure and chronic kidney disease: what you need to know. Available at: https://www.kidney.org/sites/default/files/Heart_Failure_and_CKD_2018.pdf. Accessed August 2024.

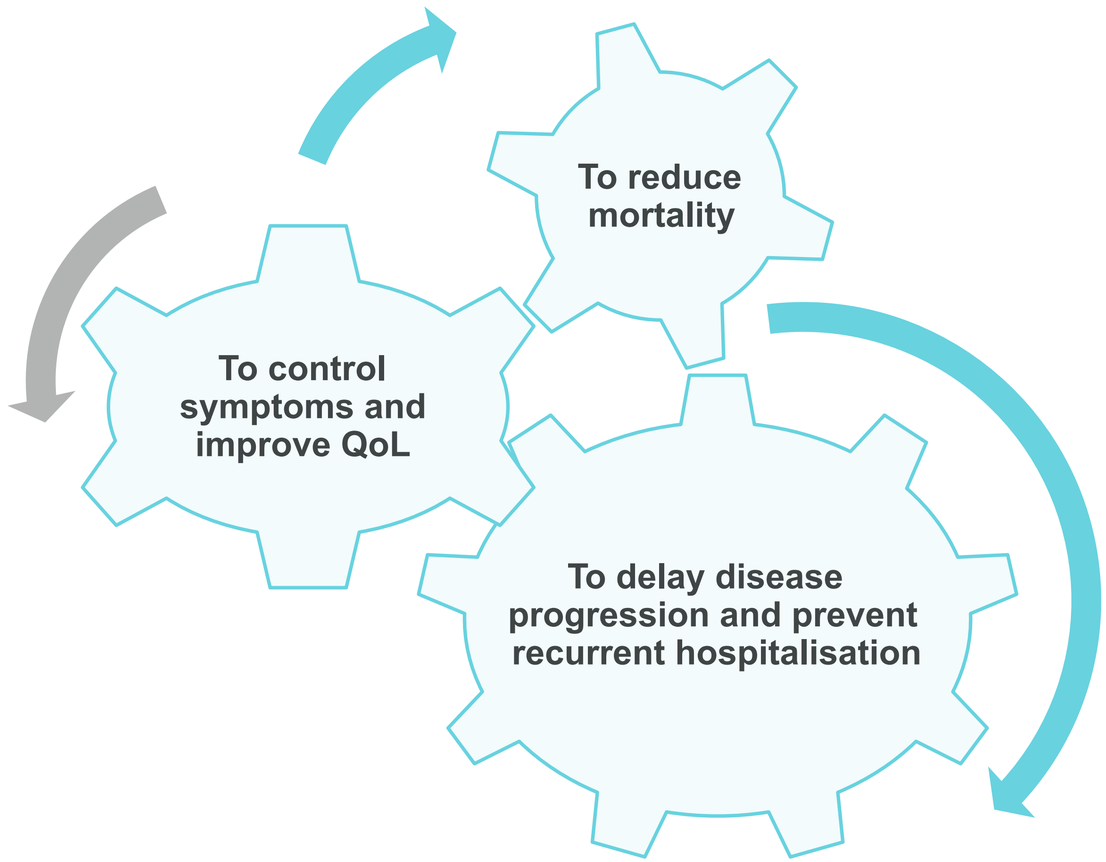
9. Hawkins NM, Virani S, Ceconi C. *Eur Heart J*. 2013;34(36):2795-2807.

10. Khalid K et al. *Cureus*. 2021;13(8):e17387.

Heart Failure Management

Goals of HF management

Below are some of the goals of HF management.[1,2]



It is hoped that the goals of HF management work together to extend a patient's lifespan, enhance their day-to-day well-being, and improve their ability to engage in activities of daily living.[1,2]

QoL, quality of life

1. Williams H. *Pharm J*. Heart failure: management. Available at: https://pharmaceutical-journal.com/article/ld/heart-failure-management. Accessed August 2024.
2. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

Management of HFrEF

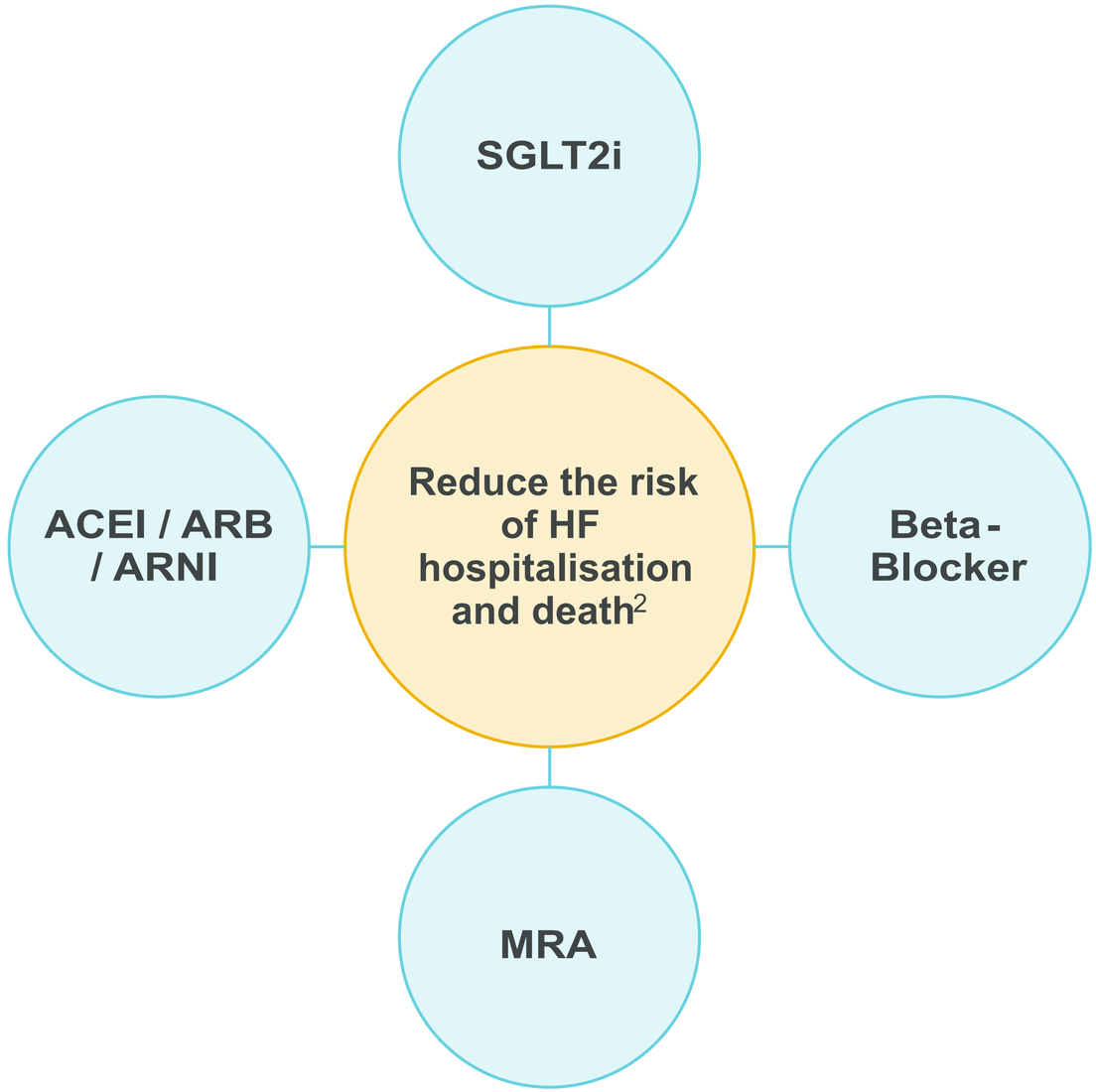
GDMT is the cornerstone of treatment for all patients with HF.[1,2]

With respect to HFrEF, the standard for GDMT is **quadruple therapy** consisting of[1,2]:

1. angiotensin-converting enzyme inhibitor (ACEI), angiotensin receptor blocker (ARB), or angiotensin receptor neprilysin inhibitor (ARNI)
2. beta-blocker
3. mineralocorticoid receptor antagonist (MRA)
4. sodium glucose cotransporter-2 inhibitor (SGLT2i)

It has been shown that GDMT in HFrEF (quadruple therapy) is **estimated to reduce the risk of CV death or hospitalisation by up to 62%** compared with limited conventional therapy, resulting in approximately **1.4 to 6.3 additional years of life**.[3]

However, evidence has also shown gaps in the use and dose of GDMT for HFrEF. Among eligible patients, 27% were not prescribed ACEIs/ARBs/ARNIs, 33% were not prescribed beta-blockers, and 67% were not prescribed MRAs.[3]



It is important that pharmacists review the national and/or local HF guidelines that are relevant to their practice to confirm recommendations, as they can vary. For instance, different guidelines may have a preferred renin-angiotensin modulator (ACEI, ARB, and/or ARNI).[1] It is also important to remember that not all medications in a particular class are indicated for HF.

CV, cardiovascular
GDMT, guideline-directed medical therapy
HFrEF, heart failure with reduced ejection fraction

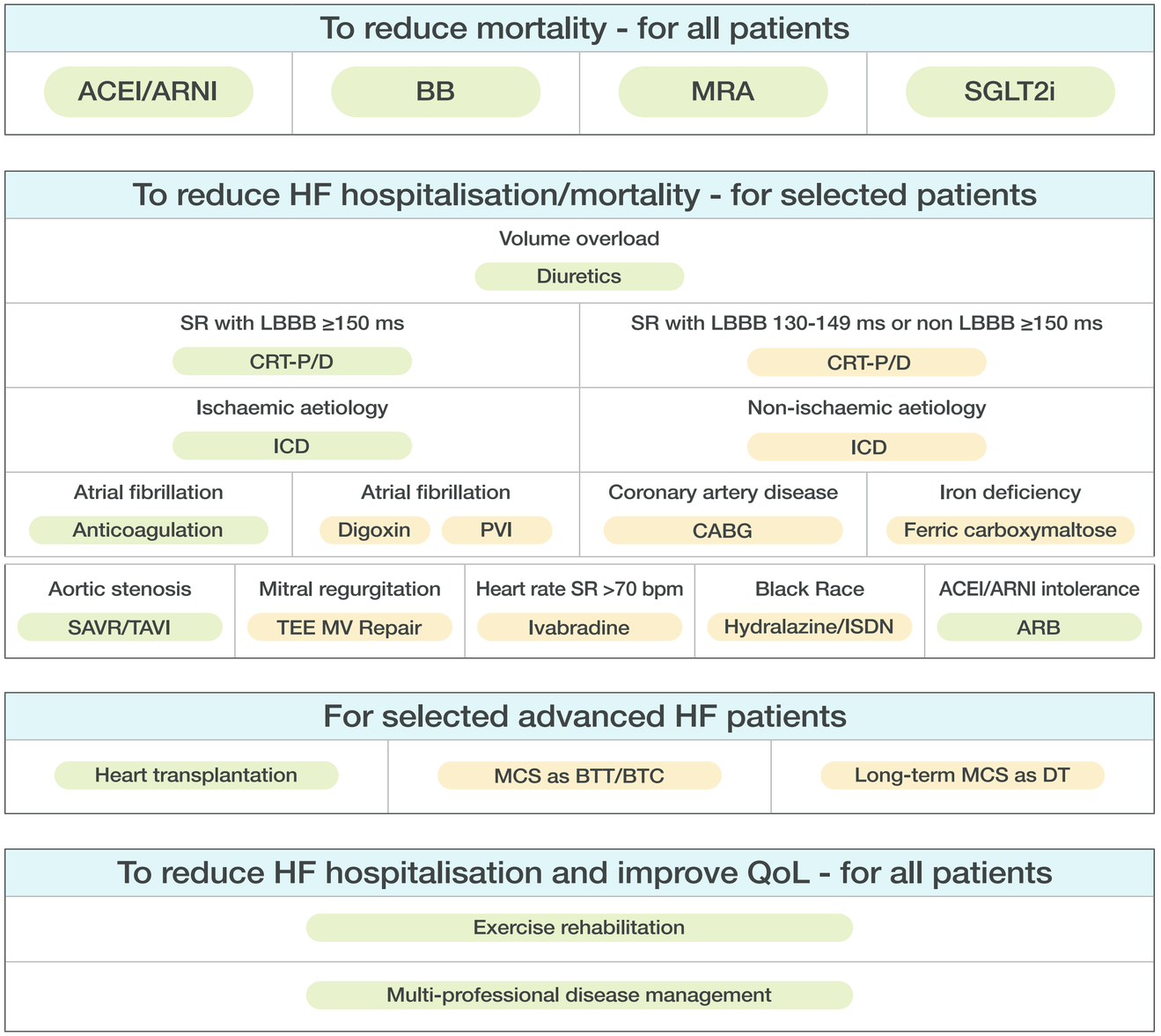
1. Morris AA, Butler J. *Circulation*. 2022;145:1371-1373.
2. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.
3. Tsao C et al. *Circulation*. 2022;145:e153-e639.

Management of HFrEF (cont'd)

While pharmacotherapy is the foundation of HFrEF management, other treatment modalities are also used to help reduce mortality, prevent recurrent hospitalisations due to worsening HF, and improve clinical status, functional capacity, and QoL.[1]

The 2021 European Society of Cardiology (ESC) guidelines for HFrEF management provide an example of the multiple treatment options available for HFrEF.[1] The green boxes indicate the treatment is recommended or is indicated and the yellow boxes indicate the treatment should be considered.[1]

The ESC recommends that pharmacotherapy be implemented alongside nonpharmacological interventions and before considering device therapy.[1]



Adapted from McDonagh T et al.[1]

ACEI, angiotensin-converting enzyme inhibitor
ARB, angiotensin receptor blocker
ARNI, angiotensin receptor-neprilysin inhibitor
BB, beta-blocker
bpm, beats per minute
BTC, bridge to candidacy
BTT, bridge to transplantation
CABG, coronary artery bypass graft
CRT-D, cardiac resynchronisation therapy with defibrillator
CRT-P, cardiac resynchronisation therapy with pacemaker
DT, destination therapy
HFrEF, heart failure with reduced ejection fraction
ICD, implantable cardioverter-defibrillator
ISDN, isosorbide dinitrate
LBBB, left bundle branch block
MCS, mechanical circulatory support
MRA, mineralocorticoid receptor antagonist
MV, mitral valve
PVI, pulmonary vein isolation
QoL, quality of life
SAVR, surgical aortic valve replacement
SGLT2i, sodium glucose co-transporter 2 inhibitor
SR, sinus rhythm
TAVI, transcatheter aortic valve replacement
TEE, transcatheter edge to edge

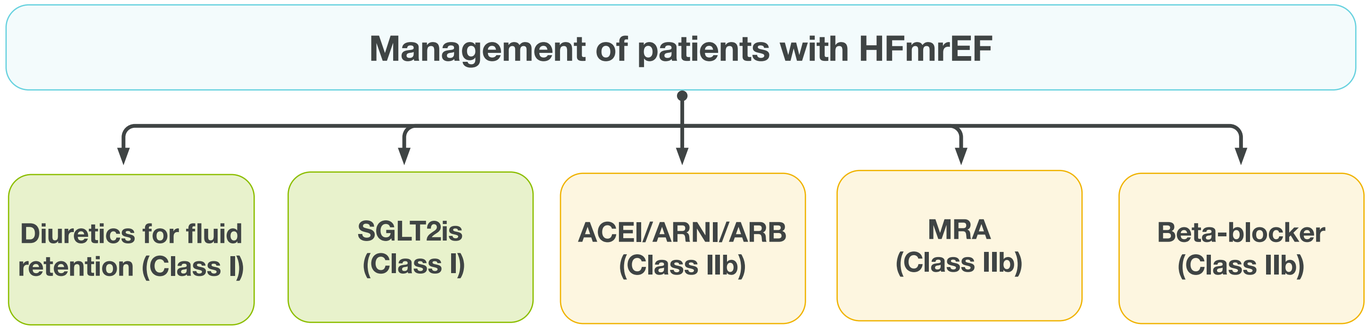
1. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

Management of HFmrEF

Recent trials with SGLT2is in patients with HF and LVEF >40% have led to an update in HFmrEF guidelines.[1]

In some HF guidelines, SGLT2is now join diuretics as recommended treatments for patient with HFmrEF.[1]

The 2023 ESC guidelines for HFmrEF management provides an example of the treatment options available for HFmrEF.[1] The green boxes indicate the treatment is recommended or is indicated and the yellow boxes indicate the treatment should be considered.[1]



Adapted from McDonagh T et al.[1]

It is important that pharmacists review the national and/or local HF guidelines that are relevant to their practice to confirm recommendations, as they can vary. It is also important to remember that not all medications in a particular class are indicated for HF.

ESC, European Society of Cardiology
HFmrEF, heart failure with mildly reduced ejection fraction
LVEF, left ventricular ejection fraction
SGLT2is, sodium glucose co-transporter 2 inhibitors

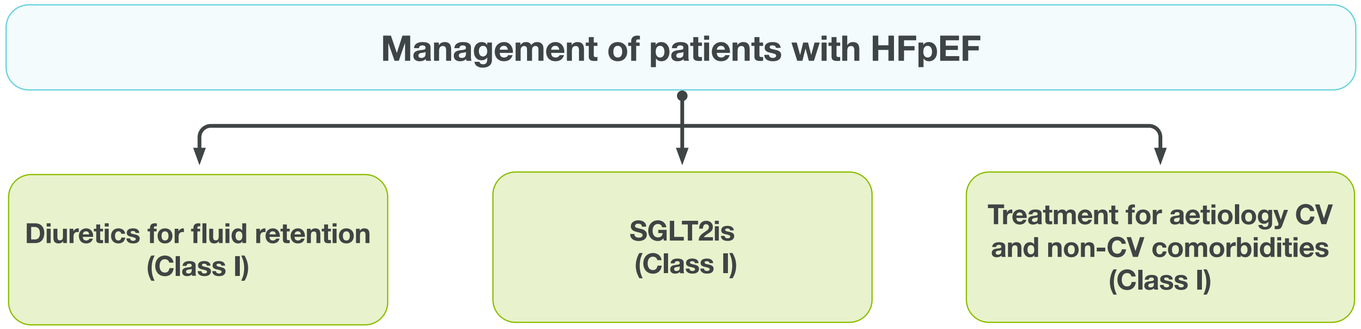
1. McDonagh T et al. *Eur Heart J.* 2023;44(37):3627-3639

ACEI, angiotensin-converting enzyme inhibitor
ARB, angiotensin receptor blocker
ARNI, angiotensin receptor-neprilysin inhibitor
MRA, mineralocorticoid receptor antagonist

Management of HFpEF

In some HF guidelines, SGLT2is join diuretics and treatment for aetiology and CV and non-CV comorbidities as recommended treatments for patient with HFpEF.[1]

The 2023 ESC guidelines for HFpEF management provides an example of HFpEF management options.[1] The green boxes indicate the treatment is recommended or is indicated.[1]



Adapted from McDonagh T et al.[1]

It is important that pharmacists review the national and/or local HF guidelines that are relevant to their practice to confirm recommendations, as they can vary. It is also important to remember that not all medications in a particular class are indicated for HF.

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CV, cardiovascular
ESC, European Society of Cardiology
HFpEF, heart failure with preserved ejection fraction
LVEF, left ventricular ejection fraction
SGLT2is, sodium glucose co-transporter 2 inhibitors

1. McDonagh T et al. *Eur Heart J*. 2023;44:3627-3639.

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Although each patient with HF should receive a patient-centric approach to therapy optimisation, a large proportion of patients have few medical contraindications to GDMT.[1] It is important to regularly assess patients' medications to confirm if/when GDMT is when appropriate.[1]

- Verify adherence and understand any omissions or concerns. Ask the patient how they take their medications, how often they miss doses, and what barriers they face. Discuss possible solutions with the patient. Provide practical support such as pill boxes (if the medications' recommended storage conditions permit), reminders, or simplified regimens.

- Review the patient's past medication history. Examine previous medications and reasons for any changes or discontinuations. Recommend optimisation strategies, such as achieving target doses and managing side effects and tolerability, where appropriate.[1]

- Share your assessments and recommendations with the prescriber and other members of the multidisciplinary team. Recommend GDMT when appropriate (eg, dose adjustments, medication substitutions, and/or medication additions) based on the patient's response, tolerability, comorbidities, and costs/ability to pay.

- Provide education and counselling to address any HF knowledge gaps, misconceptions, or fears.

- Follow up with the patient regularly to assess their progress.

GMDT, guideline-directed medical therapy

1. Sharma A et al. *JACC Basic Transl Sci*. 2022;7(5):504-517.

Pharmacological management of HF

Refer to relevant and applicable guidelines for more information.

It is also important to note that not all medications in a particular class are indicated for HF. Also, some medications may be indicated for HFrEF but not HFmrEF and HFpEF and vice versa.

Please note this is not an exhaustive list.

Table 1 | Common pharmacological treatments for HF[1-3]

Therapeutic Category	Selected Characteristics and Considerations
Angiotensin-converting enzyme inhibitors (ACEIs)	• First class of drugs shown to reduce mortality and morbidity in patients with HFrEF; also shown to improve HF symptoms • ESC guidelines recommend use in all patients with HFrEF to reduce the risk of HF hospitalisation and death unless contraindicated or not tolerated; may also be considered in patients with HFmrEF • AHA/ACCF/HFSA guidelines recommend use when the use of ARNI is not feasible • Should be uptitrated to the maximum-tolerated recommended doses
Angiotensin II receptor blockers (ARBs)	• ESC guidelines recommend use in patients with HFrEF who cannot tolerate ACEI or ARNI because of serious side effects; may also be considered in patients with HFmrEF • Not shown to reduce all-cause mortality
Angiotensin receptor-neprilysin inhibitors (ARNIs)	• AHA/ACCF/HFSA guidelines recommend as the preferred renin-angiotensin modulator • ESC guidelines recommend as a replacement for an ACEI or ARB in ambulatory patients with HFrEF who remain symptomatic, although can be considered as first-line to reduce the risk of HF hospitalisation and death; may also be considered in patients with HFmrEF • Sacubitril/valsartan was shown to be superior to enalapril in reducing hospitalisations for worsening HF, CV mortality, and all-cause mortality in patients with ambulatory HFrEF; use may also lead to a reduction in loop diuretic requirement
Mineralocorticoid receptor antagonists (MRAs)	• ESC guidelines recommend use in all patients with HFrEF, in addition to an ACEI and a beta-blocker, to reduce the risk of HF hospitalisation and death; also shown to improve HF symptoms; may also be considered in patients with HFmrEF • Eplerenone is more specific for aldosterone blockade than spironolactone and, therefore, causes less gynaecomastia • Caution should be exercised when used in patients with impaired renal function and in those with serum potassium concentrations >5.0 mmol/L
Sodium glucose co-transporter 2 inhibitors (SGLT2is)	• ESC guidelines recommend that SGLT2is, in addition to an ACEI/ARNI, a beta-blocker, and an MRA, be used in patients with HFrEF regardless of diabetes status to reduce the risk of HF hospitalisation and death • ESC guidelines recommend that SGLT2is be used in patients with HFmrEF and HFpEF to reduce the risk of HF hospitalisation or CV death • Diuretic/natriuretic properties may offer additional benefits in reducing congestion and may lead to a reduction in loop diuretic requirement

1. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.
2. Morris AA, Butler J. *Circulation*. 2022;145:1371-1373.
3. McDonagh T et al. *Eur Heart J*. 2023;44(37):3627-3639.

AHA/ACCF/HFSA, American Heart Association/American College of Cardiology Foundation/Heart Failure Society of America CV, cardiovascular
ESC, European Society of Cardiology

HFmrEF, heart failure with mildly reduced ejection fraction
HFpEF, heart failure with preserved ejection fraction
HFrEF, heart failure with reduced ejection fraction

Pharmacological management of HF (cont'd)

Refer to relevant and applicable guidelines for more information.

It is also important to note that not all medications in a particular class are indicated for HF. Also, some medications may be indicated for HFrEF but not HFmrEF and HFpEF and vice versa.

Please note this is not an exhaustive list.

Table 1 | Common pharmacological treatments for HF (cont'd)[1,2]

Therapeutic Category	Selected Characteristics and Considerations
Beta-blockers	• Shown to reduce mortality and morbidity in patients with stable HFrEF, in addition to treatment with an ACEI and diuretic; also shown to improve HF symptoms; may also be considered in patients with HFmrEF • ESC guidelines recommend that an ACEI and beta-blocker be started together as soon as the diagnosis of symptomatic HFrEF is established • Should be initiated in stable, euvolaemic patients at a low dose and gradually uptitrated to the maximum-tolerated dose
Loop diuretics	• ESC guidelines recommend to be used in patients with HFrEF with signs and/or symptoms of congestion to alleviate HF symptoms, improve exercise capacity, and reduce HF hospitalisations • Also recommended in patients with HFmrEF and HFpEF and congestion in order to alleviate signs and symptoms • Aim of diuretic therapy is to achieve and maintain euvolaemia with the lowest possible dose • Patients should be educated to self-adjust their diuretic dose based on congestion symptoms/signs and daily weight
I_f channel inhibitor	• ESC guidelines recommend to consider use in symptomatic patients with LVEF ≤35%, in SR, and a resting heart rate ≥70 bpm, despite treatment with an evidence-based dose of beta-blocker (or maximum tolerated dose below that), ACEI/(or ARNI), and an MRA, to reduce the risk of HF hospitalisation and CV death • ESC guidelines recommend to consider use in symptomatic patients with LVEF ≤35%, in SR, and a resting heart rate ≥70 bpm, who are unable to tolerate or have contraindications for a beta-blocker to reduce the risk of HF hospitalisation and CV death, along with an ACEI (or ARNI) and an MRA • Beta-blocker should be started and uptitrated to guideline recommended/maximally tolerated doses prior to ivabradine
Vasodilator antihypertensive and nitrate	• ESC guidelines recommend to be considered in self-identified black patients with LVEF ≤35% or with an LVEF <45% combined with a dilated left ventricle in NYHA class III-IV despite treatment with an ACEI (or ARNI), a beta-blocker, and an MRA to reduce the risk of HF hospitalisation and death • ESC guidelines recommend to be considered in patients with symptomatic HFrEF who cannot tolerate any dose of an ACEI, an ARB, or ARNI (or they are contraindicated) to reduce the risk of death • No clear evidence to use in all patients with HFrEF
Cardiac glycoside	• ESC guidelines recommend to be considered in patients with symptomatic HFrEF in sinus rhythm despite treatment with an ACEI (or ARNI), a beta-blocker, and an MRA, to reduce the risk of hospitalisation (all-cause and HF hospitalisations)

ACEI, angiotensin-converting enzyme inhibitor
ARB, angiotensin II receptor blocker
ARNI, angiotensin receptor-neprilysin inhibitor

1. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.
2. McDonagh T et al. *Eur Heart J*. 2023;44(37):3627-3639.

bpm, beats per minute
CV, cardiovascular
ESC, European Society of Cardiology
HFmrEF, heart failure with mildly reduced ejection fraction
HFpEF, heart failure with preserved ejection fraction
HFrEF, heart failure with reduced ejection fraction
LVEF, left ventricular ejection fraction
MRA, mineralocorticoid receptor antagonist
NYHA, New York Heart Association
SR, sinus rhythm
XL/XR, extra long/extended release

Nonpharmacological management of HF

All patients with HF, regardless of cause, should be supported to make lifestyle changes that may improve their health.[1]

Key interventions may include[1]:

- Quitting smoking
- Eating healthy, such as moderating salt intake, increasing fruit and vegetable intake, and reducing saturated fat
- Losing weight (if obese)
- Increasing physical activity, striving for at least 30 minutes of exercise on most days of the week
- Moderating alcohol intake to below recommended national or local limits (patients with alcoholic cardiomyopathy should be advised to avoid alcohol entirely)

1. Williams H. *Pharm J*. Heart failure: management. Available at: https://pharmaceutical-journal.com/article/ld/heart-failure-management. Accessed August 2024.

Your Role in Heart Failure Care

Role of the pharmacist

HF is a multi-faceted and life-threatening disease that has been defined as a global pandemic. It is characterized by significant health, social, and economic costs.[1]

Despite strides in reducing tobacco-related issues, hypertension, and high cholesterol in affluent regions, the relentless rise in overweight and obesity has partially offset these gains. Thus, the need for symptom control and lifestyle interventions in HF is now more critical than ever.[2]

Leveraging their central role in healthcare, community pharmacists can make a substantial impact by delivering focused interventions for precise symptom control, providing specialised counselling to enhance medication adherence, and coordinating care plans for effective symptom management.[3]

Pharmacists emerge as key allies in the global battle against HF, actively engaging in services to enhance patient outcomes.[3]

Pharmacists, as accessible primary healthcare providers, are ideally positioned to support better management and outcomes for patients with HF, building on their existing involvement in cardiovascular risk factor management.[4]

There are multiple touch points within the pharmacy for at-risk screening and symptom management interventions.

Routine pharmacy services may reveal patient risk factors for heart failure or existing HF symptoms, making them ideal touchpoints for further patient counselling and referral

Pharmacists can provide counselling on medication use/ adherence, advising on dietary adjustments, and recognising signs of deterioration

To learn more about the pharmacist role in HF care, visit FIP's Cardiovascular Diseases page at: https://ncd.fip.org/cardiovascular-diseases/

FIP, Fédération Internationale Pharmaceutique (International Pharmaceutical Federation)

1. Savarese G et al. *Cardiovasc Res*. 2022;118:3272-3287.
2. World Heart Federation. Cholesterol white paper. Available at: https://world-heart-federation.org/wp-content/uploads/2021/05/World-Heart-Federation-Cholesterol-White-paper.pdf. Accessed August 2024.
3. International Pharmaceutical Federation (FIP). FIP statement of policy; The role of pharmacists in non-communicable diseases. Available at: https://www.fip.org/file/4338. Accessed August 2024.
4. International Pharmaceutical Federation (FIP). Beating NCDs in the community: The contribution of pharmacists. Available at: https://www.fip.org/files/content/publications/2019/beating-ncds-in-the-community-the-contribution-of-pharmacists.pdf. Accessed August 2024.

There are resources to help! Support for pharmacy across the HF care services journey

1

Recognition of the value of HF care services in your pharmacy but don't know where to start

- Service Framework eLearning Module

2

Assessment of your team's readiness and preparation for HF care services initiation

- Service Implementation Checklist
- **FIP** Knowledge and Skills Reference Guide for Professional Development in Cardiovascular Diseases

3

Evaluate your pharmacy's demographic to assess focus of HF care services

- Pharmacy management computer system
- Team knowledge of patients

4

Team training on HF

- HF eLearning Module
- **FIP** Cardiovascular Diseases: A Handbook for Pharmacists
- **FIP** Knowledge and Skills Reference Guide for Professional Development in Cardiovascular Diseases

5

Team training on utilisation of Chronic Disease Service Framework

- Service Framework eLearning Module

6

Promotion of HF care services to patients and colleagues

- Service Promotion Poster
- Prescriber Service Promotion Letter

7

Implementation of the HF care services in your pharmacy

- HF Assessment Tool
- HF Patient Information Leaflet
- HF Primary Care Referral Letter

FIP, Fédération Internationale Pharmaceutique (International Pharmaceutical Federation)

Your role in symptom management

For patients and HCPs (including pharmacists), managing HF symptoms can be complex and challenging, particularly in older patients and those with comorbidities.[1]

The main HF symptoms relate to **fluid retention**, which can give rise to[1]:

- increase in dyspnoea, orthopnoea, and paroxysmal nocturnal dyspnoea, as a result of pulmonary congestion or pulmonary oedema
- peripheral oedema, which can range from mild swelling of the ankles to gross oedema, including abdominal ascites, and at times extending to the genitalia and beyond

Managing the effects of fluid overload can be challenging and include the use of[1]:

- diuretics
- fluid and salt restriction
- daily weighing
- education of the patient and caregivers on ways to recognise and respond early to deterioration
- education on the importance of treatment adherence

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Pharmacists can play an important role in helping patients manage their HF symptoms by:

- monitoring patients' symptoms
- tailoring medication reviews
- supporting medication adherence
- promoting effective self-care strategies

From a patient's perspective, the ability to carry out normal daily activities may be more important than longevity; therefore, symptom management is an essential component of HF care.[2]

HCPs, healthcare professionals

1. Warren A, Kenny C, Murphy K. *Pharm J*. How to support patients being treated for chronic heart failure. Available at: https://pharmaceutical-journal.com/article/ld/how-to-support-patients-being-treated-for-chronic-heart-failure. Accessed August 2024.

2. Williams H. *Pharm J*. Heart failure: management. Available at: https://pharmaceutical-journal.com/article/ld/heart-failure-management. Accessed August 2024.

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Patients face challenges in recognising the connection between their symptoms and the progression of HF.[1]

- **Educate patients:** Provide essential information to help patients recognise worsening symptoms and seek timely guidance. Use patient language when discussing HF to help patients understand what has happened to them.

- **Encourage engagement:** Foster open communication, encouraging patients to discuss their concerns and symptoms.

- **Monitor and guide:** Regularly assess symptoms, offering personalised support and recommendations to address any deterioration effectively.

A key question to consider during these patient interactions is whether any of their symptoms are worsening.

1. Alpert CM et al. *Heart Fail Rev*. 2017;22(1):25-39.

01

Symptom management
Self-care strategies

As with many other chronic conditions, education in self-care strategies is important for the patient with HF to maintain health.[1]

Development of multidisciplinary HF services is important to ensure patients learn about the condition, its trajectory, its management, and how to access professional help when their disease starts to progress.[1]

Pharmacists can help patients with HF by[1]:

- Supporting **medication adherence**
- Offering **lifestyle advice**, eg, advice on regular physical activity, smoking cessation, and fluid and dietary recommendations
- Providing guidance on **recognising and responding to symptom deterioration**
- **Referring** patients to appropriate websites and support groups

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A **patient-centred approach** should be taken at all times. Pharmacists should remain aware that patients may experience barriers to self-care, such as depression, anxiety, or impaired cognition, which may reduce motivation and adherence.[1]

1. Warren A, Kenny C, Murphy K. *Pharm J*. How to support patients being treated for chronic heart failure. Available at: https://pharmaceutical-journal.com/article/ld/how-to-support-patients-being-treated-for-chronic-heart-failure. Accessed August 2024.

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- Regularly discuss the need for support from family, friends, HCPs, and/or HF groups.[1]
- Refer for psychological support when necessary.[1]

HCPs, healthcare professionals

1. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

02

Symptom management
Salt restriction

The recommended daily intake of salt for adults in many countries is 6 g (or 2.5 g of sodium), which equates to only a teaspoon of salt a day.[1]

Advice to guide patients is essential, since there is much “hidden” salt in food, particularly in processed foods.[1]

Strategies to help patients include education on[1]:

- food labelling
- foods to avoid
- how to limit salt intake

Practical suggestions that pharmacists can give patients include removing salt from the dining table and using herbs, spices, and fresh lemon or lime juice as alternative seasonings.[1]

Importantly, patients should be advised to avoid salt substitutes, which usually contain potassium salts, due to the risks of hyperkalaemia (particularly in the presence of renal impairment or with use of ACEIs or aldosterone antagonists).[1]

Although there is much in the media and medical literature about salt intake and its detrimental effects on health for patients with chronic HF, studies supporting sodium restriction are limited.[1]

Patients and caregivers often indicate to the pharmacy teams that salt restriction is one of the most difficult aspects of self-management.[1]

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ACEIs, angiotensin-converting enzyme inhibitors

1. Warren A, Kenny C, Murphy K. *Pharm J*. How to support patients being treated for chronic heart failure. Available at: https://pharmaceutical-journal.com/article/ld/how-to-support-patients-being-treated-for-chronic-heart-failure. Accessed August 2024.

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- Discuss current food intake, role of salt, and role of micronutrients.[1]
- Refer to dietician or nutritionist as required.

1. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

03

Symptom management
Fluid intake

There is a paucity of evidence on the restriction of fluids for patients with HF and some guidelines advise that routine fluid restriction is of no benefit except in patients with severe HF or those with concomitant hyponatraemia.[1]

Nonetheless, it is important to establish each patient's usual fluid intake. Many patients (particularly elderly patients) do not have a high fluid intake.[1]

It is good practice to review the need for fluid restriction on an individual basis and advise according to[1]:

- severity of symptoms
- body mass index
- weather conditions
- electrolyte levels
- occurrence of diarrhoea, vomiting, or fever

ACT NOW +

Avoid recommending fluid restriction to all patients with HF until usual fluid intake as been established.

1. Warren A, Kenny C, Murphy K. *Pharm J*. How to support patients being treated for chronic heart failure. Available at: https://pharmaceutical-journal.com/article/ld/how-to-support-patients-being-treated-for-chronic-heart-failure. Accessed August 2024.

ACT NOW

- Provide verbal, print, and/or digital information and discuss the advantages and disadvantages of fluid restriction.[1]
- Advise to adjust fluid intake to weight, and during times of high heat and humidity, nausea/vomiting.[1]
- Adjust your advice during periods of acute decompensation and consider altering advice on fluid intake for patients who may be at end of life.[1]

1. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

04

Symptom management
Recognising deterioration

Patients with HF require education on recognising the signs and symptoms of disease progression, and the daily recording of weight is central to this.[1]

Such signs and symptoms tend to indicate fluid retention. Adjustment of diuretic dose, along with the monitoring of renal function, can often resolve the situation or prevent further deterioration.[1]

Over-diuresis may also occur alongside fluid and electrolyte loss and risk of deterioration in renal function. Early signs of over-diuresis include excessive urination, weight loss, tiredness, muscle weakness, dizziness, and dry skin. Patients with HF who are new to diuretic therapy, those with a recent increase in the dose of their diuretic, and those with diarrhoea or vomiting should be particularly vigilant; early recognition of over-diuresis, with diuretic adjustment and renal function monitoring, are crucial.[1]

Patients should also be given advice on what to do if they experience[1]:

- chest pain
- acute shortness of breath
- dizziness

In addition, patients should be made aware that their condition can destabilise if they develop an infection.[1]

ACT NOW +

Advise patients with HF to **weigh themselves each day** and to **keep a record**. This way patients can inform their doctor and/or pharmacist as soon as issues arise.[2]

Provide patients with HF the following guidance regarding daily weight checks[2]:

- Weigh yourself at the same time each day, using the same scale that is placed on a hard, flat surface
- Do not wear shoes
- Wear the same clothing or wear nothing each time you weigh yourself
- Best time to weigh is in the morning after you go to the bathroom and before you drink or eat breakfast
- Compare your daily weight to your dry weight (“dry weight” is how much you weigh without extra fluids)
- Talk with your doctor about how to find your dry weight
- Keep a calendar next to your scale and write your weight on it each day so you can take it with you to medical visits
- Keep notes on how you feel each day so your doctor and/or pharmacist can compare it with your weight
- Contact your doctor if you notice a sudden weight gain (eg, 1.35 kg or more in 2 to 3 days)
- A sudden weight gain may mean that your HF is getting worse

1. Warren A, Kenny C, Murphy K. *Pharm J*. How to support patients being treated for chronic heart failure. Available at: https://pharmaceutical-journal.com/article/ld/how-to-support-patients-being-treated-for-chronic-heart-failure. Accessed August 2024.
2. American College of Cardiology. Heart failure: checking your weight daily. Available at: https://www.pardeehospital.org/app/files/public/e0841ab5-b053-457a-88eb-b620a0f888c6/cardiosmart-heart-failure-3.pdf. Accessed August 2024.

ACT NOW

Understand some of the signs and symptoms that can indicate deterioration of a patient's HF.

Regularly review these with the patient[1,2]:

Increased shortness of breath with a decrease in exercise tolerance

Weight gain of more than 2 kg in 2 days

New orthopnoea

Paroxysmal nocturnal dyspnoea

Worsening of peripheral oedema or ascites

1. Warren A, Kenny C, Murphy K. *Pharm J*. How to support patients being treated for chronic heart failure. Available at: https://pharmaceutical-journal.com/article/ld/how-to-support-patients-being-treated-for-chronic-heart-failure. Accessed August 2024.
2. Bozkurt B et al. *Eur J Heart Fail*. 2021;23:352-380.

05

Symptom management
Physical activity

It is a misconception that patients with HF will not be able to participate in exercise programmes.[1]

Among patients with HF, physical conditioning through exercise has been shown to[1]:

- increase exercise tolerance
- improve health-related QoL
- reduce hospital admissions

The ESC recommends regular aerobic exercise, ideally as part of a multidisciplinary care programme, to improve functional capacity and symptoms.[1]

Referring the patient to local programmes designed for cardiac patients can improve uptake and ongoing participation.[1]

Did you know?

Patients with HF should aim for 150 minutes of moderate intensity physical activity a week, or 30 minutes of physical activity on most days of the week. However, the activity can be spread out. Patients can do a few 5-10-minute sessions over the course of a day.[2]

ACT NOW +

ESC, European Society of Cardiology

QoL, quality of life

1. Warren A, Kenny C, Murphy K. *Pharm J*. How to support patients being treated for chronic heart failure. Available at: https://pharmaceutical-journal.com/article/ld/how-to-support-patients-being-treated-for-chronic-heart-failure. Accessed August 2024.

2. British Heart Foundation (BHF). Exercise for Heart Failure. Available at: https://www.bhf.org.uk/informationsupport/heart-matters-magazine/activity/exercise-for-heart-failure. Accessed August 2024.

ACT NOW

- Advise on physical activity that recognises physical and functional limitations, such as frailty and comorbidities.[1]
- Refer to exercise programme or other activity modes as appropriate.[1]
- Discuss possible barriers and opportunities.[1]

1. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

06

Symptom management
Travel advice

Patients should be given the following advice prior to travelling[1]:

- Shorter periods of travel are preferred when possible
- Be aware that long-haul flights may cause problems such as dehydration, pulmonary embolism, and deep vein thrombosis (DVT)
- Place all medication and important documents in carry-on luggage
- Limit alcohol, coffee, and salt-containing snacks on flights and throughout the trip
- Ensure an adequate fluid intake during flights and throughout the trip
- Changes in bowel habits in high temperatures and humidity may occur, leading to dehydration
- Increase fluid intake with oral rehydration solutions and monitor body weight and urinary output to avoid dehydration with uncomplicated traveller's diarrhoea
- Avoid strenuous activity in a hot environment
- Alteration of the dose of diuretic during travel may be required to prevent excessive fluid loss
- Seek medical attention if HF symptoms worsen

When people with HF travel by air or are subjected to high altitude, high temperatures, and high humidity, there may be changes in their fluid balance that may exacerbate their condition.[1]

ACT NOW +

1. Von Haehling et al. *Nat Rev Card*. 2022:19;302-313.

ACT NOW

- Inform and discuss practical issues related to long trips, staying abroad, exposure to sun (amiodarone effects), high humidity or heat (dehydration), and high altitude (oxygenation).[1]
- Provide practical travel advice as it relates to medication and devices (eg, keep medications in hand luggage, carry a list of medications, medical devices, and treatment centres).[1]
- Advise about local/national/international regulations related to driving.[1]

1. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

07

Symptom management
Managing medications

Pharmacists should be alert to medication-related issues among patients with HF, especially those with complex regimens. It may be necessary to[1]:

- adapt labelling for visually impaired patients
- simplify treatment regimens
- engage family members or caregivers to assist with administration
- make patients aware that any change to their medicines, or the addition of a new treatment, may require closer monitoring of their HF

There are several commonly used medications that should avoided or used with caution for patients with HF, including NSAIDs. These medications can cause fluid retention and renal impairment, resulting in decompensation of HF that can lead to hospital admission.[1]

Patients should be trained to self-adjust their diuretic dose based on monitoring of signs and symptoms of congestion and daily weight measurements.[2]

ACT NOW +

NSAIDs, nonsteroidal anti-inflammatory drugs

1. Warren A, Kenny C, Murphy K. *Pharm J*. How to support patients being treated for chronic heart failure. Available at: https://pharmaceutical-journal.com/article/ld/how-to-support-patients-being-treated-for-chronic-heart-failure. Accessed August 2024.

2. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

ACT NOW

Understand the common medications that need to be avoided or used with caution (only on the advice on a doctor) in patients with HF[1,2]:

- NSAIDs + COX2 Inhibitors
- Corticosteroids
- Antacids with high sodium content
- Soluble analgesics with high sodium content
- CCBs
- Antiarrhythmic medicines
- Pioglitazone, metformin (caution and dose reduction in renal impairment); metformin is contraindicated in severe renal impairment (GFR <30 mL/min)

COX2, cyclooxygenase-2
CCBs, calcium channel blockers
GFR, glomerular filtration rate
NSAIDs, non-steroidal anti-inflammatory drugs

1. Warren A, Kenny C, Murphy K. *Pharm J*. How to support patients being treated for chronic heart failure. Available at: https://pharmaceutical-journal.com/article/ld/how-to-support-patients-being-treated-for-chronic-heart-failure. Accessed August 2024.
2. Electronic Medicines Compendium (EMC). Metformin 500 mg film coated tablets: summary of product characteristics (SmPC). Available at: https://www.medicines.org.uk/emc/product/10759/smpc#gref. Accessed August 2024.

Additional counselling points

Factor	Recommendation
Alcohol consumption	• Inform and discuss alcohol intake according to local prevention guidelines[1]
Diet	• Discuss ways to eat healthily and avoid excess salt, and review the importance of maintaining a healthy body weight[1]
Sleep	• Advise and discuss the importance of good sleep and provide advice on “sleep health”[1]
Immunisations	• Discuss benefits and possible barriers[1] • Advise on local immunisation practice[1]
Sexual activity	• Inform and discuss that sexual activity is safe for stable HF patients[1] • Refer to specialist for sexual counselling when necessary[1]
Family and caregivers	• Discuss the preference of caregiver/family involvement[1] • Involve patients and caregivers in a respectful way[1]

1. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

HF management cycle in the pharmacy

REVIEW

- Nature and magnitude of current symptoms
- Clinical response to current therapy
- Need for GDMT

ASSESS

- Current or future risk of disease progression
- Medication adherence
- Side effects
- Control of comorbidities (eg, CKD, hypertension, diabetes)

REFER

- Recommend GDMT when applicable
- Recommend dosing modifications when appropriate
- Provide information to primary care on actions taken and/or follow-up plan

EDUCATE

- Awareness of HF symptoms and importance of reporting
- Seriousness of HF
- Importance of preventing hospitalisation and readmission
- Importance of monitoring weight
- Importance of managing other conditions
- Role of nonpharmacological approaches (lifestyle modifications)

As medication management experts, pharmacists can play an integral role in HF management by providing direct interventions (eg, medication education and disease management), as a support to the physician's action, in order to[1]:

- improve medication adherence
- achieve the goals of desired therapeutic outcomes
- improve safe medication

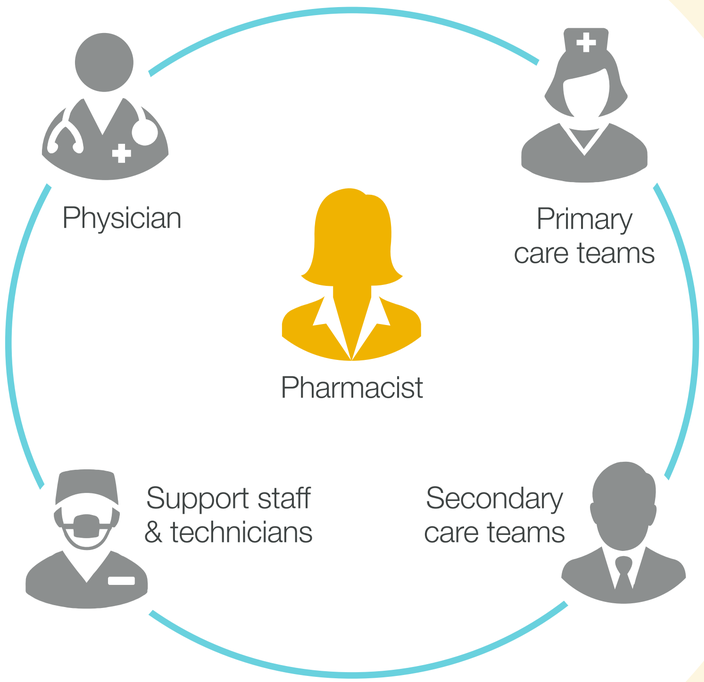
In some jurisdictions, pharmacists have prescribing rights, which may permit them to adjust HF therapy without consultation with a physician.

CKD, chronic kidney disease
GDMT, guideline-directed medical therapy

1. Omboni S, Caserini M. *Open Heart*. 2018;5:e000687.

Connecting HCPs
A collaborative approach

Pharmacists can play a central role in HF care, particularly through a collaborative approach to patient care. This involves working closely with doctors, specialists, and patients to ensure optimal treatment outcomes.



As integral team members, pharmacists must demonstrate:

Communication and transparency

Ensure all communications with patients, doctors, and other HCPs are open and transparent. Provide clear, accurate, and timely information.[1]

Proficiency

By remaining current with the latest research and guidelines, pharmacists can provide their input regarding medication plans to prescribers.

Alignment with patient expectations

By leveraging available resources (electronic health records), pharmacists can offer insights into the treatment process that align with physicians' treatment plans. This may foster realistic expectations among patients regarding their treatment and progress, enhancing patient-provider relationships and adherence.

Aligning with treatment plans also strengthens relationships with the prescribers and other HCPs. Pharmacists can bridge the gap between medication and symptom management.

ACT NOW +

HCPs, healthcare professionals

1. National Institute for Health and Care Excellence (NICE). Patient experience in adult NHS services: improving the experience of care for people using adult NHS services. Available at: https://www.nice.org.uk/guidance/cg138/chapter/Introduction. Accessed August 2024.

ACT NOW

While not all prescribers or patients may accept your advice or recommendations initially, consistent demonstration of your expertise in the treatment of HF will help establish trust and increase acceptance of your suggestions over time.

By utilising tools within the **HF pharmacy toolkit**, you can instill confidence in prescribers that you are taking accountability for the continuation of care to mutually meet the needs of the patient.

- Use the **Service Promotion Letter** (located in the **Chronic Disease Service Framework Pharmacy Toolkit**) to inform local prescribers (physicians, nurse practitioners, physician assistants, etc) about the value of pharmacy-based services that can support and augment current prescriber-directed interventions.

- Summarise each patient visit using the **Patient Information Leaflet** to provide patients with the key points they need to know about HF, their risk factors, symptoms, and next steps.

- Collaborate with primary care using the **Referral Letter**. Accurately document your assessment and outline any key recommendations that may optimise patient outcomes.

Case Study

Meet Debby

Debby is a 67-year-old retired schoolteacher. She has also been managing hypertension, type 2 diabetes, and hyperlipidaemia for over a decade. Debby was diagnosed a few years ago with HFrEF.

- Moderately active lifestyle, social smoker
- Occasional use of OTC medications for joint pain
- Recent persistent cough resulting in interrupted sleep
- Visits the pharmacy for OTC sleeping tablets and to collect regular medications
- Appears pale and out of breath

Medications

- Bisoprolol tablets – 5 mg once daily
- Sacubitril/Valsartan tablets – 49/51 mg twice daily
- Metformin MR tablets – 1000 mg once daily
- Atorvastatin tablets – 10 mg once daily
- Ferrous fumarate tablets – 210 mg once daily

Was Debby's pharmacist comfortable taking an active role in her HF care?

Yes, with the help of the HF Pharmacy Toolkit

HFrEF, heart failure with reduced ejection fraction
MR, modified release
OTC, over-the-counter

01

ACT NOW

Utilise the HF pharmacy toolkit to help you recognise moments where you can engage with patients like Debby to:

- Assess their current understanding of HF
- Advise how HF may be a contributing factor to their worsening symptoms and may be impacting their health
- Provide valuable information on symptom management, treatment, and follow-up
- Support patients in their care journey

Caring for HF patients like Debby in the pharmacy

Below are the steps pharmacists and their teams can take every day to identify and care for patients at risk of HF and diagnosed patients with new or worsening symptoms of HF. They can start a conversation and motivate patients to take action, and collaborate with primary care.

STEP 1
Recognise and Identify

Positively impacting patients starts with accurate identification of patients at risk of HF and HF patients with new or worsening symptoms.

Earlier identification can drive earlier diagnosis and timely initial treatment and escalation or de-escalation of current treatment.

Increasing patient awareness of HF at point of care can help trigger conversations with the pharmacy team.

STEP 2
Start a Conversation and Take Action

Motivating patients with HF to take action involves a continuous and conscious effort by the entire pharmacy team.

Using effective counselling techniques and an integrated plan can help streamline engagement with HF patients, from initiation through the monitoring phase of the journey.

STEP 3
Collaborate with Primary Care

Communicating and collaborating with primary care can optimise care for patients at risk of HF or those diagnosed patients at risk of disease progression.

Effectively and efficiently documenting an HF assessment and providing key recommendations can help build a strong collaborative care partnership and promote a seamless experience for patients.

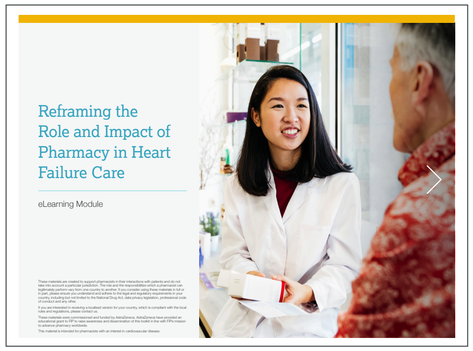
The **HF Pharmacy Toolkit** can help structure and formalise this process for HF care!

Use of the Pharmacy Toolkit resources in the HF care journey

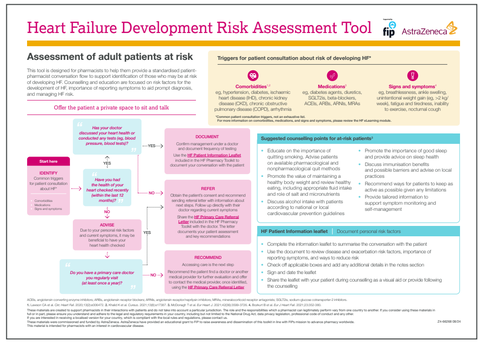
STEP 1
Recognise and Identify

STEP 2
Start a Conversation and Take Action

STEP 3
Collaborate with Primary Care

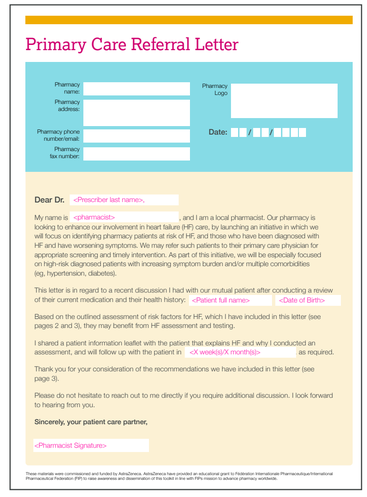


Disease State e-Learning Module



Disease State Assessment Tool

Patient Information Leaflet



Primary Care Referral Letter

Identifying Debby's risk

Based on foundational disease state knowledge gained in the **HF eLearning Module**, Debby's pharmacist recognised that Debby may be experiencing new/worsening symptoms of HF.

However, Debby did not seem to recognise her symptoms were worsening or that they were related to HF. She stated that her changing symptoms were due instead to her recent increase in smoking.

After completing this eLearning Module (and reviewing resources in the **HF Pharmacy Toolkit**), the pharmacist felt confident that she could maximise the time she spent with Debby.

Patients with HF frequently adapt to the variability of their symptoms. As a result, they might not notice or report when their symptoms deviate from their usual daily experiences.[1]

1. Alpert CM et al. *Heart Fail Rev*. 2017;22(1):25-39.

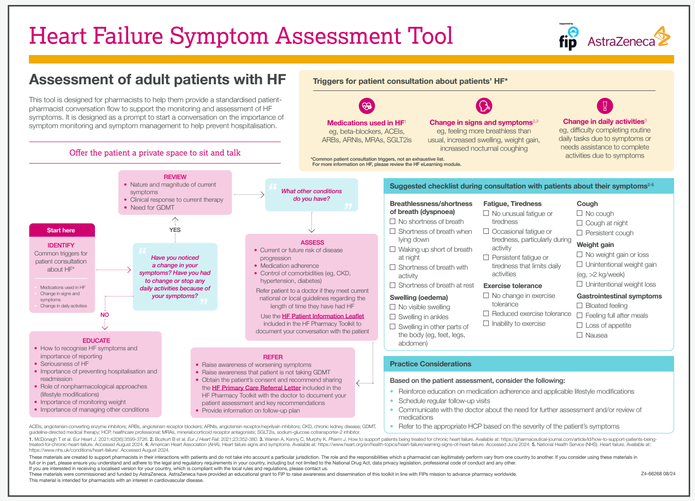
Using change in signs and symptoms as an HF patient consultation trigger

During the initial interaction with the pharmacy team member, Debby reported that she had disturbed sleep due to a persistent cough she has had for the past few weeks and asked the pharmacist if she could recommend anything to help alleviate the cough.

- The following risk factors were identified during that initial interaction and review of patient profile:
  - Recent nonadherence to medication – items not collected
  - Recent blood pressure reading of 165/98
  - Increasing symptom burden

The pharmacist planned to open the HF consultation with Debby by asking her about her symptoms. The pharmacist suspected that Debby may need education about understanding her conditions (particularly HFrEF) and what her recent worsening symptoms may indicate to help prevent further events.

The pharmacist hoped discussing the possible negative impact of the symptoms she is experiencing would lead to an impactful conversation around adherence and lifestyle modifications to empower her to manage her conditions.


Heart Failure Symptom Assessment Tool

fip AstraZeneca

Assessment of adult patients with HF

This tool is designed for pharmacists to help them provide a standardised patient-pharmacist conversation flow to support the monitoring and assessment of HF symptoms. It is designed as a prompt to start a conversation on the importance of symptom monitoring and symptom management to help prevent hospitalisation.

Offer the patient a private space to sit and talk

Triggers for patient consultation about patients' HF*

Medications used in HF[1] eg, beta-blockers, ACEIs, ARBs, ARNIs, MRAs, SGLT2is

Change in signs and symptoms[1,2] eg, feeling more breathless than usual, increased swelling, weight gain, increased nocturnal coughing

Change in daily activities[1] eg, difficulty completing routine daily tasks due to symptoms or needs assistance to complete activities due to symptoms

*Common patient consultation triggers, not an exhaustive list. For more information on HF, please review the HF eLearning module.

REVIEW
- Nature and magnitude of current symptoms
- Clinical response to current therapy
- Need for GDMT

"What other conditions do you have?"

YES

Start here

IDENTIFY
Common triggers for patient consultation about HF*

Medications used in HF
Change in signs and symptoms
Change in daily activities

"Have you noticed a change in your symptoms? Have you had to change or stop any daily activities because of your symptoms?"

NO

ASSESS
- Current or future risk of disease progression
- Medication adherence
- Control of comorbidities (eg, CKD, hypertension, diabetes)

Refer patient to a doctor if they meet current national or local guidelines regarding the length of time they have had HF.

Use the HF Patient Information Leaflet included in the HF Pharmacy Toolkit to document your conversation with the patient

EDUCATE
- How to recognise HF symptoms and importance of reporting
- Seriousness of HF
- Importance of preventing hospitalisation and readmission
- Role of nonpharmacological approaches (lifestyle modifications)
- Importance of monitoring weight
- Importance of managing other conditions

REFER
- Raise awareness of worsening symptoms
- Raise awareness that patient is not taking GDMT
- Obtain the patient's consent and recommend sharing the HF Primary Care Referral Letter included in the HF Pharmacy Toolkit with the doctor to document your patient assessment and key recommendations
- Provide information on follow-up plan

Suggested checklist during consultation with patients about their symptoms[2-5]

Breathlessness/shortness of breath (dyspnoea)
- ☐ No shortness of breath
- ☐ Shortness of breath when lying down
- ☐ Waking up short of breath at night
- ☐ Shortness of breath with activity
- ☐ Shortness of breath at rest

Swelling (oedema)
- ☐ No visible swelling
- ☐ Swelling in ankles
- ☐ Swelling in other parts of the body (eg, feet, legs, abdomen)

Fatigue, Tiredness
- ☐ No unusual fatigue or tiredness
- ☐ Occasional fatigue or tiredness, particularly during activity
- ☐ Persistent fatigue or tiredness that limits daily activities

Exercise tolerance
- ☐ No change in exercise tolerance
- ☐ Reduced exercise tolerance
- ☐ Inability to exercise

Cough
- ☐ No cough
- ☐ Cough at night
- ☐ Persistent cough

Weight gain
- ☐ No weight gain or loss
- ☐ Unintentional weight gain (eg, >2 kg/week)
- ☐ Unintentional weight loss

Gastrointestinal symptoms
- ☐ Bloated feeling
- ☐ Feeling full after meals
- ☐ Loss of appetite
- ☐ Nausea

Practice Considerations

Based on the patient assessment, consider the following:
- Reinforce education on medication adherence and applicable lifestyle modifications
- Schedule regular follow-up visits
- Communicate with the doctor about the need for further assessment and/or review of medications
- Refer to the appropriate HCP based on the severity of the patient's symptoms

ACEIs, angiotensin-converting enzyme inhibitors; ARBs, angiotensin-receptor blockers; ARNIs, angiotensin-receptor/neprilysin inhibitors; CKD, chronic kidney disease; GDMT, guideline-directed medical therapy; HCP, healthcare professional; MRAs, mineralocorticoid receptor antagonists; SGLT2is, sodium-glucose cotransporter-2 inhibitor.

1. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726. 2. Bozkurt B et al. *Eur J Heart Fail*. 2021;23:352-380. 3. Warren A, Kenny C, Murphy K. *Pharm J*. How to support patients being treated for chronic heart failure. Available at: https://pharmaceutical-journal.com/article/ld/how-to-support-patients-being-treated-for-chronic-heart-failure. Accessed August 2024. 4. American Heart Association (AHA). Heart failure signs and symptoms. Available at: https://www.heart.org/en/health-topics/heart-failure/warning-signs-of-heart-failure. Accessed June 2024. 5. National Health Service (NHS). Heart failure. Available at: https://www.nhs.uk/conditions/heart-failure/. Accessed August 2024.

Z4-660168 08/24

HFrEF, heart failure with reduced ejection fraction

STEP 2b
Start a Conversation and Take Action

Motivating Debby to take action

The pharmacist used the **HF Assessment Tool** to guide her interventions.

REVIEW

- Discussed the nature and magnitude of Debby's worsening symptoms
- Debby appeared to be a candidate for GDMT for HFrEF

ASSESS

- Debby was found to be at risk of worsening HF following assessment of her symptoms
- Blood pressure reading 158/92
- Financial stress may be contributing to worsening symptoms
- Reduction in physical activity
- Increase in smoking habit
- Drinking more than usual
- Nonadherence to medications
- Not weighing herself at home

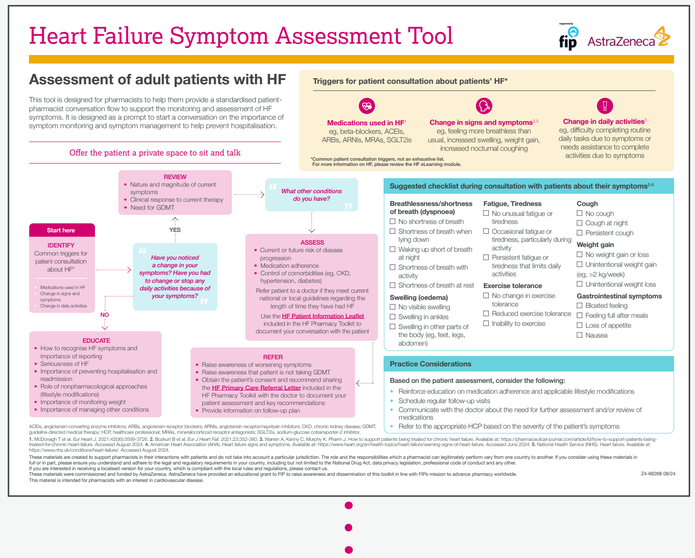
EDUCATE

- Stressed the need to report new or changing symptoms as soon as possible
- Outlined the importance of medication adherence, and of lifestyle modifications, especially with her current comorbidities
- Discussed the importance of smoking cessation
- Reminded Debby that the pharmacy is here to help with prescription and nonprescription medications that can increase the chance of her success

REFER

- Plan to discuss possible need for changes in Debby's HFrEF treatment with her doctor
- Will include BP readings and new findings to help guide treatment plan

BP, blood pressure
GDMT, guideline-directed medical therapy
HFrEF, heart failure with reduced ejection fraction



Suggested checklist during consultation with patients about their symptoms2-5

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☐ Shortness of breath with activity
☐ Shortness of breath at rest
Swelling (oedema)
☐ No visible swelling
☐ Swelling in ankles
☐ Swelling in other parts of the body (eg, feet, legs, abdomen)
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☐ Occasional fatigue or tiredness, particularly during activity
☐ Persistent fatigue or tiredness that limits daily activities
Exercise tolerance
☐ No change in exercise tolerance
☐ Reduced exercise tolerance
☐ Inability to exercise
Cough
☐ No cough
☐ Cough at night
☐ Persistent cough
Weight gain
☐ No weight gain or loss
☐ Unintentional weight gain (eg, >2 kg/week)
☐ Unintentional weight loss
Gastrointestinal symptoms
☐ Bloated feeling
☐ Feeling full after meals
☐ Loss of appetite
☐ Nausea

Providing holistic advice over multiple visits

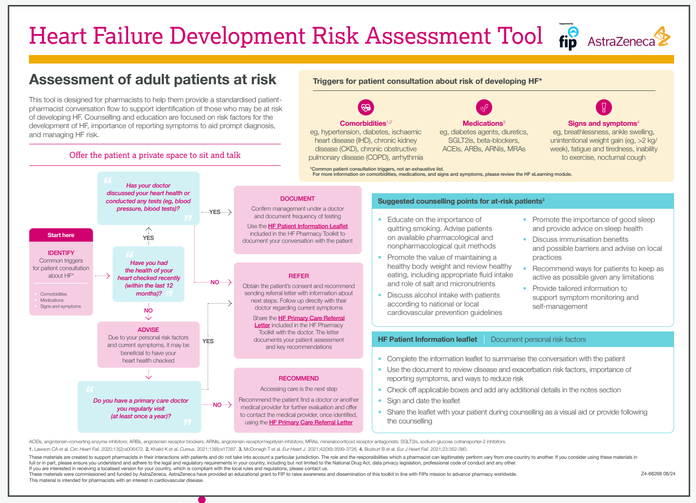
The pharmacist's initial HF conversation with Debby focused on the following:

- Importance of Debby reporting new or changing symptoms to the pharmacist and/or doctor as soon as possible
- Importance of medication adherence and how the pharmacy could help increase her chance of success with her medications
- How her current changes in lifestyle and behaviours could be impacting her conditions

The pharmacist's assessment and conversation with Debby involved a significant amount of education and required communicating several key recommendations. Consequently, the pharmacist concluded it would be best to reinforce this information by providing advice to Debby over multiple visits.

Suggested counselling points for at-risk patients[3]

- Educate on the importance of quitting smoking. Advise patients on available pharmacological and nonpharmacological quit methods
- Promote the value of maintaining a healthy body weight and review healthy eating, including appropriate fluid intake and role of salt and micronutrients
- Discuss alcohol intake with patients according to national or local cardiovascular prevention guidelines
- Promote the importance of good sleep and provide advice on sleep health
- Discuss immunisation benefits and possible barriers and advise on local practices
- Recommend ways for patients to keep as active as possible given any limitations
- Provide tailored information to support symptom monitoring and self-management



Heart Failure Development Risk Assessment Tool

fip AstraZeneca

Assessment of adult patients at risk

This tool is designed for pharmacists to help them provide a standardised patient-pharmacist conversation flow to support identification of those who may be at risk of developing HF. Counselling and education are focused on risk factors for the development of HF, importance of reporting symptoms to aid prompt diagnosis, and managing HF risk.

Offer the patient a private space to sit and talk

Triggers for patient consultation about risk of developing HF*

Comorbidities[1,2]
eg, hypertension, diabetes, ischaemic heart disease (IHD), chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), arrhythmia

Medications[3]
eg, diabetes agents, diuretics, SGLT2is, beta-blockers, ACEIs, ARBs, ARNIs, MRAs

Signs and symptoms[1]
eg, breathlessness, ankle swelling, unintentional weight gain (eg, >2 kg/week), fatigue and tiredness, inability to exercise, nocturnal cough

*Common patient consultation triggers, not an exhaustive list. For more information on comorbidities, medications, and signs and symptoms, please review the HF eLearning module.

Start here

IDENTIFY
Common triggers for patient consultation about HF*:
- Comorbidities
- Medications
- Signs and symptoms

"Has your doctor discussed your heart health or conducted any tests (eg, blood pressure, blood tests)?" — YES

"Have you had the health of your heart checked recently (within the last 12 months)?" — NO

ADVISE
Due to your personal risk factors and current symptoms, it may be beneficial to have your heart health checked

"Do you have a primary care doctor you regularly visit (at least once a year)?" — NO

DOCUMENT
Confirm management under a doctor and document frequency of testing
Use the HF Patient Information Leaflet included in the HF Pharmacy Toolkit to document your conversation with the patient

REFER
Obtain the patient's consent and recommend sending referral letter with information about next steps. Follow up directly with their doctor regarding current symptoms
Share the HF Primary Care Referral Letter included in the HF Pharmacy Toolkit with the doctor. The letter documents your patient assessment and key recommendations

RECOMMEND
Accessing care is the next step
Recommend the patient find a doctor or another medical provider for further evaluation and offer to contact the medical provider, once identified, using the HF Primary Care Referral Letter

Suggested counselling points for at-risk patients[3]

- Educate on the importance of quitting smoking. Advise patients on available pharmacological and nonpharmacological quit methods
- Promote the value of maintaining a healthy body weight and review healthy eating, including appropriate fluid intake and role of salt and micronutrients
- Discuss alcohol intake with patients according to national or local cardiovascular prevention guidelines
- Promote the importance of good sleep and provide advice on sleep health
- Discuss immunisation benefits and possible barriers and advise on local practices
- Recommend ways for patients to keep as active as possible given any limitations
- Provide tailored information to support symptom monitoring and self-management

HF Patient Information leaflet | Document personal risk factors

- Complete the information leaflet to summarise the conversation with the patient
- Use the document to review disease and exacerbation risk factors, importance of reporting symptoms, and ways to reduce risk
- Check off applicable boxes and add any additional details in the notes section
- Sign and date the leaflet
- Share the leaflet with your patient during counselling as a visual aid or provide following the counselling

ACEIs, angiotensin-converting enzyme inhibitors; ARBs, angiotensin receptor blockers; ARNIs, angiotensin receptor/neprilysin inhibitors; MRAs, mineralocorticoid receptor antagonists; SGLT2is, sodium-glucose cotransporter-2 inhibitors.

1. Lawson CA et al. *Circ Heart Fail.* 2020;13(2):e006472. **2.** Khalid K et al. *Cureus.* 2021;13(8):e17387. **3.** McDonagh T et al. *Eur Heart J.* 2021;42(36):3599-3726. **4.** Boutouri B et al. *Eur J Heart Fail.* 2021;23:352-360.

These materials were commissioned and funded by AstraZeneca. AstraZeneca have provided an educational grant to FIP to raise awareness and dissemination of this toolkit in line with FIP's mission to advance pharmacy worldwide.

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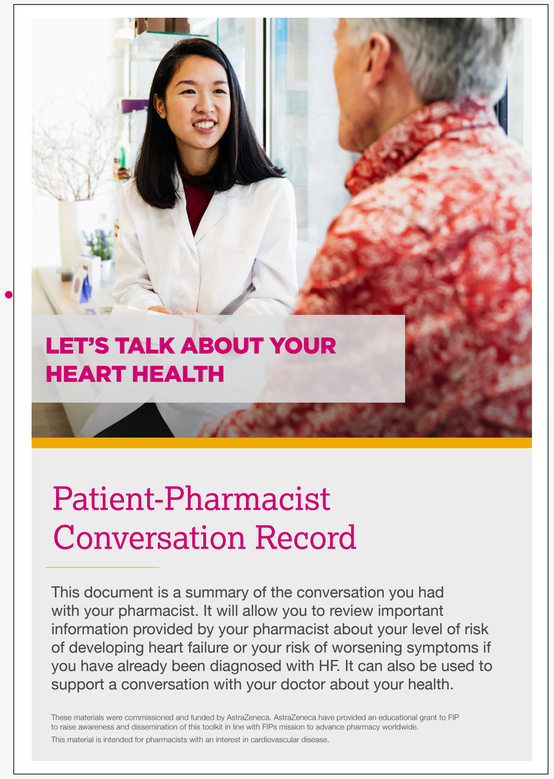
Summarising Debby's visit using the Patient Information Leaflet

To ensure Debby received the maximum benefit from the HF assessment and counselling, the pharmacist provided Debby with the completed **HF Patient Information Leaflet**.

The personalised patient information leaflet was filled out by the pharmacist as she was interacting with Debby, to summarise the pharmacist-patient interaction. The leaflet also served as a visual aid during her conversation with Debby.

The pharmacist checked off the boxes applicable to Debby and added additional details as needed. The pharmacist then signed and dated the document.



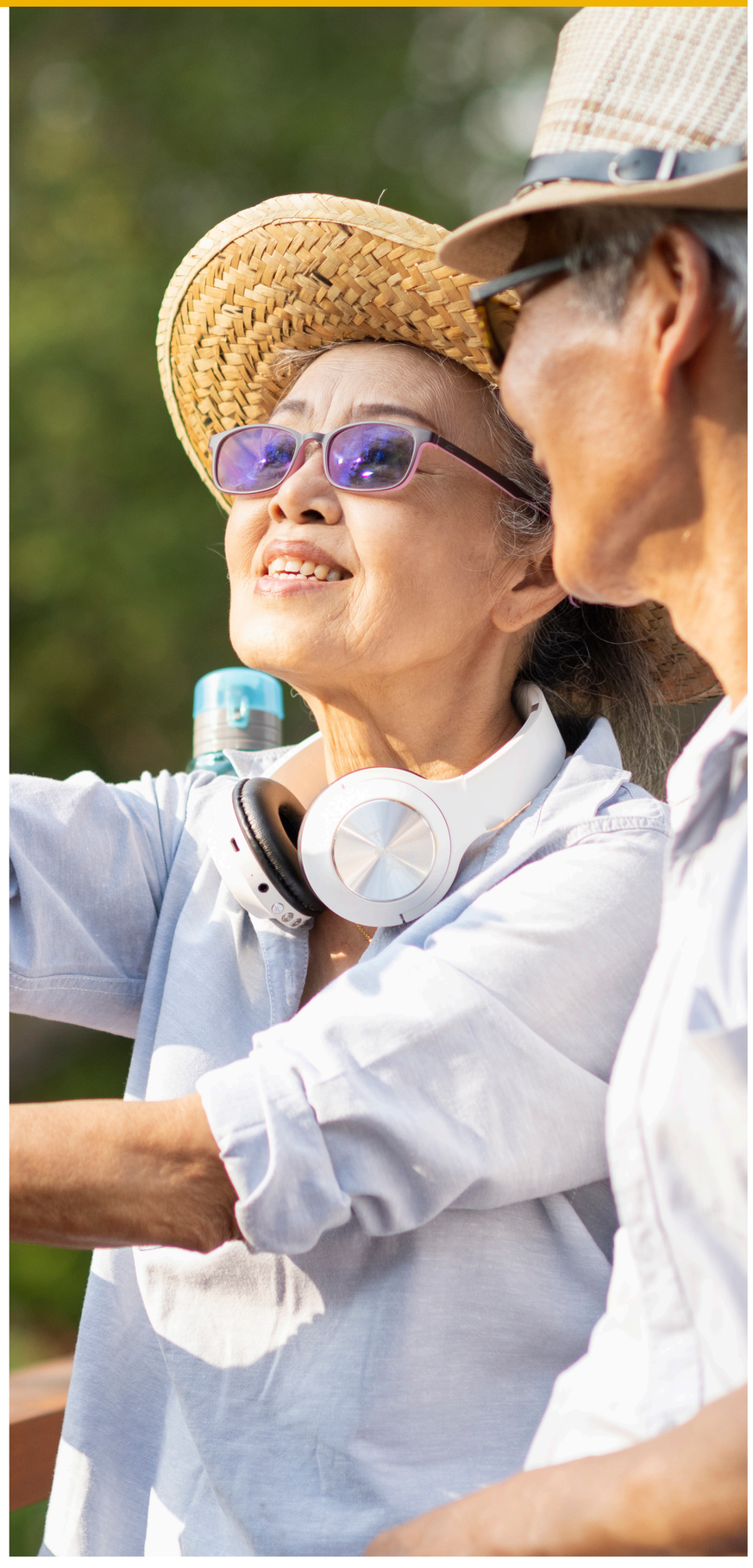
Sharing the completed information leaflet with Debby

Once the pharmacist completed the **HF Patient Information Leaflet**, she shared it with Debby and encouraged her to share the HF leaflet with her family and doctor.

The pharmacist advised Debby to review the document at home. She was counselled to write down any questions she had after reviewing the document again and to bring those questions with her on her next visit. Debby was told she could also call the pharmacy if she had urgent questions.

The pharmacist reminded Debby to stay in regular contact with her doctor and the pharmacy, particularly when she is experiencing any new or worsening symptoms.

Debby was asked if the pharmacy could follow up with her in 2 weeks if she had not visited the pharmacy in the interim.



HFrEF, heart failure with reduced ejection fraction
MR, modified release
OTC, over-the-counter

Documenting assessment of Debby and key recommendations

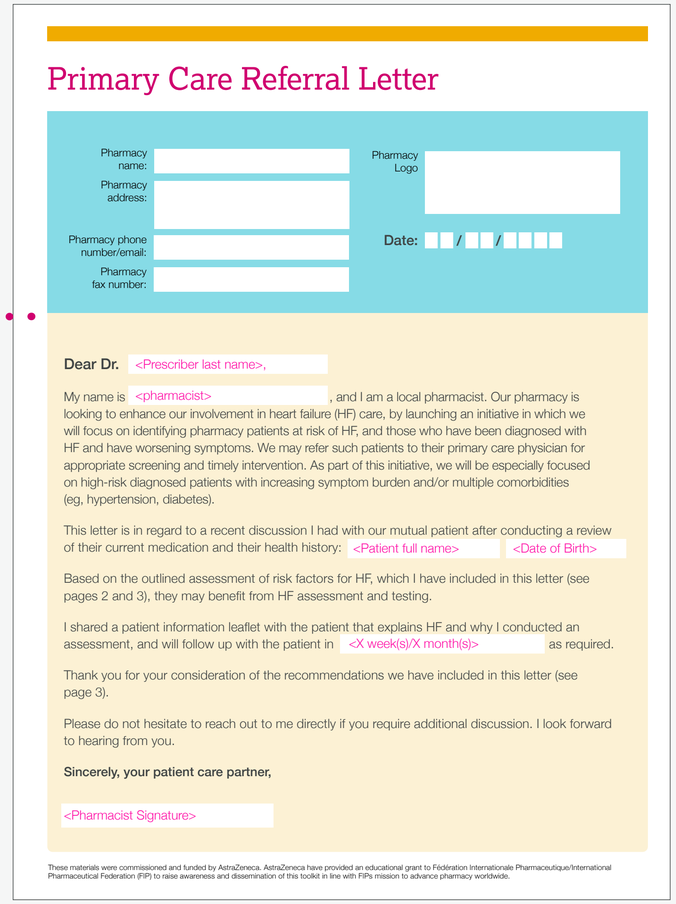
Before Debby left the pharmacy, the pharmacist received Debby's consent to share her assessment and details of their conversation directly with her doctor using the **HF Primary Care Referral Letter**.

The pharmacist recognised that fully documenting her assessment and key recommendations could help build a strong partnership with Debby's doctor and promote a seamless experience.

The pharmacist completed the customisable referral letter to provide an outline of the intervention.

Page 1 was completed first and provided a summary of important points for Debby's doctor. The pharmacist then completed the remaining pages, in which she summarised the results of her assessment of Debby, including risk factors for worsening symptoms, current medications, and key recommendations.

The pharmacist also provided final comments in the space available on the last page.



Primary Care Referral Letter

Pharmacy name:
Pharmacy address:
Pharmacy phone number/email:
Pharmacy fax number:
Pharmacy Logo
Date: ☐☐ / ☐☐ / ☐☐☐☐

Dear Dr. <Prescriber last name>,

My name is <pharmacist>, and I am a local pharmacist. Our pharmacy is looking to enhance our involvement in heart failure (HF) care, by launching an initiative in which we will focus on identifying pharmacy patients at risk of HF, and those who have been diagnosed with HF and have worsening symptoms. We may refer such patients to their primary care physician for appropriate screening and timely intervention. As part of this initiative, we will be especially focused on high-risk diagnosed patients with increasing symptom burden and/or multiple comorbidities (eg, hypertension, diabetes).

This letter is in regard to a recent discussion I had with our mutual patient after conducting a review of their current medication and their health history: <Patient full name> <Date of Birth>

Based on the outlined assessment of risk factors for HF, which I have included in this letter (see pages 2 and 3), they may benefit from HF assessment and testing.

I shared a patient information leaflet with the patient that explains HF and why I conducted an assessment, and will follow up with the patient in <X week(s)/X month(s)> as required.

Thank you for your consideration of the recommendations we have included in this letter (see page 3).

Please do not hesitate to reach out to me directly if you require additional discussion. I look forward to hearing from you.

Sincerely, your patient care partner,

<Pharmacist Signature>

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Sharing the referral letter with Debby's doctor

The referral letter explained why the pharmacist was reaching out to Debby's doctor.

The pharmacist documented recommendations to support Debby's HF symptom management and help prevent future decline, including:

- Review of current hypertensive medication considering current BP readings
- Optimisation of Debby's current HFrEF medications by prescribing quadruple therapy (ie, use of ARNI/beta-blocker/MRA/SGLT2i)

The referral letter was signed by the pharmacist and sent by a pharmacy team member by email to the doctor.

The pharmacist planned on following up with Debby's doctor in 1 week to see if he had any questions.

ARNI, angiotensin receptor neprilysin inhibitor
BP, blood pressure
HFrEF, heart failure with reduced ejection fraction
MRA, mineralocorticoid receptor antagonist
SGLT2i, sodium glucose cotransporter-2 inhibitor

Module Key Learnings

Key learnings

- HF is a multi-faceted and life-threatening syndrome characterised by significant morbidity and mortality, poor functional capacity and QoL, and high health, social, and economic costs.[1]
- Comorbidities may promote exacerbation of HF, worsen survival, and complicate treatment.[2,3] Thus, management of comorbidities is a key component in the holistic care of patients with HF.
- Pharmacists, as accessible primary healthcare providers, are ideally positioned to support better management and outcomes for patients with HF, building on their existing involvement in cardiovascular risk factor management.[4]
- You and your pharmacy team members can play a vital role in helping patients access appropriate HF care.

QoL, quality of life

1. Savarese G et al. *Cardiovasc Res*. 2022;118:3272-3287.
2. Screever EM et al. *Clin Res Cardiol*. 2023;112:123-133.
3. Khalid K et al. *Cureus*. 2021;13(8):e17387.
4. International Pharmaceutical Federation (FIP). Beating NCDs in the community: The contribution of pharmacists. Available at: https://www.fip.org/files/content/publications/2019/beating-ncds-in-the-community-the-contribution-of-pharmacists.pdf. Accessed August 2024.

Module Learning Checkpoints

Learning checkpoint

Q1 Which of the following are typical symptoms of HF?

A. Shortness of breath

B. Fatigue

C. Ankle swelling

D. Weight loss

E. Loss of appetite

Answer

Q1 Which of the following are typical symptoms of HF?

- ✓ Shortness of breath
- ✓ Fatigue
- ✗ Ankle swelling
- ✗ Weight loss
- ✗ Loss of appetite

Loss of appetite and weight loss can indeed be symptoms of HF, although they are less common than symptoms like shortness of breath, fatigue, and swelling in the legs or abdomen.[1]

1. Bozkurt B et al. *Eur J Heart Fail*. 2021;23:352-380.

Learning checkpoint

Q2 All patients with HF, regardless of cause, should be supported to make lifestyle changes that may improve their health.

True

False

Answer

Q2 **All patients with HF, regardless of cause, should be supported to make lifestyle changes that may improve their health.**

✓ True

False

This statement is true.

All patients with HF, regardless of cause, should be supported to make lifestyle changes that may improve their health.[1]

Providing lifestyle advice has become a key component of education for self-care.[2]

1. Williams H. *Pharm J*. Heart failure: management. Available at: https://pharmaceutical-journal.com/article/ld/heart-failure-management. Accessed August 2024.
2. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

Learning checkpoint

Q3 HFrEF patients without contraindications appear to gain the greatest benefit from combined treatment with which of the following:

A. ACEI, a beta-blocker, an MRA, and an SGLT2i

B. ARNI, a beta-blocker, an MRA, and an SGLT2i

C. ARNI, a beta-blocker, a diuretic, and an SGLT2i

ACEI, angiotensin-converting enzyme inhibitor
ARNI, angiotensin receptor-neprilysin inhibitor
HFrEF, heart failure with reduced ejection fraction
MRA, mineralocorticoid receptor antagonist
SGLT2i, sodium glucose co-transporter 2 inhibitor

Answer

Q3 **HFrEF patients without contraindications appear to gain the greatest benefit from combined treatment with which of the following:**

A. ACEI, a beta-blocker, an MRA, and an SGLT2i

✓ **B.** ARNI, a beta-blocker, an MRA, and an SGLT2i

C. ARNI, a beta-blocker, a diuretic, and an SGLT2i

B is correct.

An ARNI (or ACEI), a beta-blocker, and an MRA are recommended therapies for patients with HF, unless the drugs are contraindicated or not tolerated. SGLT2is are added to the triad of therapy to reduce the risk of CV death and worsening HF in patients with HFrEF.[1]

ACEI, angiotensin-converting enzyme inhibitor
ARNI, angiotensin receptor-neprilysin inhibitor
HFrEF, heart failure with reduced ejection fraction
MRA, mineralocorticoid receptor antagonist
SGLT2i, sodium glucose co-transporter 2 inhibitor

1. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

Learning checkpoint

Q4 Which of the following are goals of the management of HF that work in synergy for optimum outcomes?

A. To control symptoms and improve QoL

B. To reduce mortality

C. To delay disease progression and prevent recurrent hospitalisation

D. To decrease exercise capacity

QoL, quality of life

Answer

Q4 Which of the following are goals of the management of HF that work in synergy for optimum outcomes?

✓ To control symptoms and improve QoL

✓ To reduce mortality

✓ To delay disease progression and prevent recurrent hospitalisation

✗ To decrease exercise capacity

The goals of managing HF are to[1,2]:

- control symptoms and improve QoL
- reduce mortality
- delay disease progression

QoL, quality of life

1. Williams H. *Pharm J*. Heart failure: management. Available at: https://pharmaceutical-journal.com/article/ld/heart-failure-management. Accessed August 2024.
2. McDonagh T et al. *Eur Heart J*. 2021;42(36):3599-3726.

Learning checkpoint

Q5 Which of the following are roles pharmacists can play in the care of patients with HF?

A. During pharmacy visits, regularly talk with patients with HF about symptoms, including any new or worsening ones

B. Deliver focused individualised interventions for precise symptom control

C. Provide specialised counselling to enhance HF medication adherence

D. Coordinate and collaborate with other HCPs in developing treatment plans for effective symptom and medication management

HCPs, healthcare professionals

Answer

Q5 Which of the following are roles pharmacists can play in the care of patients with HF?

- ✓ During pharmacy visits, regularly talk with patients with HF about symptoms, including any new or worsening ones
- ✓ Deliver focused individualised interventions for precise symptom control
- ✓ Provide specialised counselling to enhance HF medication adherence
- ✓ Coordinate and collaborate with other HCPs in developing treatment plans for effective symptom and medication management

All of these are **important roles pharmacists can play** in the care of patients with HF.

HCPs, healthcare professionals

Glossary of Common Terms

Glossary

Atrial fibrillation: irregular heartbeat that occurs when beating in the atria (upper chambers of the heart) is abnormal, and blood cannot flow properly from the 2 atria to the 2 ventricles (lower chambers of the heart).[1]

Cardiomyopathy: diseases of the heart muscle, where the walls of the heart chambers have become stretched, thickened, or stiff, which affects the heart's ability to pump blood around the body.[2]

Cardiovascular diseases (CVDs): group of disorders of the heart and blood vessels, including coronary heart disease (disease of the blood vessels supplying the heart), heart failure, cerebrovascular disease (disease of the blood vessels supplying the brain [eg, stroke]), and peripheral arterial disease (disease of blood vessels supplying the arms and legs).[3]

Chronic diseases: conditions that last 1 year or more and require ongoing medical attention or limit activities of daily living or both. Chronic diseases are caused by a combination of genetic, physiological, environmental, and behavioural factors. They are also known as noncommunicable diseases (NCDs).[4,5]

Chronic kidney disease: abnormalities of kidney structure or function, including markers of kidney damage and a reduced glomerular filtration rate (GFR), that have been present for at least 3 months and with implications for health.[6]

Chronic obstructive pulmonary disease: lung disease that causes the airways to narrow and become obstructed, which in turn makes breathing difficult. It has been described as a disease of the airways (chronic bronchitis) and/or a disease of the air sacs (emphysema).[7]

1. Centers for Disease Control and Prevention (CDC). About atrial fibrillation. Available at: https://www.cdc.gov/heart-disease/about/atrial-fibrillation.html. Accessed August 2024.
2. National Health Service. Cardiomyopathy. Available at: https://www.nhs.uk/conditions/cardiomyopathy/. Accessed August 2024.
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4. Centers for Disease Control and Prevention (CDC). About Chronic Diseases. Available at: https://www.cdc.gov/chronic-disease/about/index.html. Accessed August 2024.
5. World Health Organization (WHO). Noncommunicable diseases – Fact sheet. Available at: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases. Accessed October 2023.
6. National Institute for Health and Care Excellence (NICE). Chronic kidney disease in adults. Available at: https://www.nice.org.uk/guidance/qs5/resources/chronic-kidney-disease-in-adults-pdf-58297746373. Accessed August 2024.
7. Global Allergy and Airways Patient Platform (GAAPP). What is COPD? Available at: https://gaapp.org/diseases/copd/. Accessed August 2024.

Glossary (cont'd)

Diabetes: disease that causes hyperglycaemia (also known as high blood glucose or high blood sugar), which occurs when the pancreas does not produce enough of the hormone insulin or when the body cannot effectively use the insulin it produces.[1]

Dyspnoea: shortness of breath.[2]

End-diastolic volume: volume of blood in the ventricles before the heart contracts.[3]

Heart attack: acute event that occurs when blood flow to the heart is severely reduced or blocked and heart muscle cells die from lack of oxygen; also known as a myocardial infarction.[4]

Heart failure: type of CVD that occurs when the heart cannot pump enough blood to the body's vital organs. Although the heart works, it does not work as well as it should. This can cause fluid to pool in the body, which manifests as swelling (oedema) in the lower legs and ankles and shortness of breath as fluid collects in the lungs.[4]

Hypertension: elevated blood pressure that occurs when the pressure in the blood vessels is typically 140/90 mmHg or higher. It is also known as high blood pressure.[5]

Ischaemic heart disease (IHD): type of CVD that occurs when heart arteries become narrowed due to the buildup of plaque, which results in less blood and oxygen reaching the heart muscle. It is sometimes also referred to as coronary artery disease.[4]

Orthopnoea: shortness of breath while lying down that goes away on standing or sitting up.[6]

CVD, cardiovascular disease

1. World Health Organization (WHO). Diabetes – Fact sheet. Available at: https://www.who.int/news-room/fact-sheets/detail/diabetes. Accessed August 2024.

2. Zoppi L. Medical News Today. Paroxysmal Nocturnal Dyspnea. Available at: https://www.medicalnewstoday.com/articles/paroxysmal-nocturnal-dyspnea. Accessed August 2024.

3. Eske J. Medical News Today. What is end-diastolic volume? Available at: https://www.medicalnewstoday.com/articles/325498. Accessed August 2024.

4. U.S. Department of Health and Human Services. The health consequences of smoking—50 years of progress: A report of the Surgeon General. Available at: https://www.ncbi.nlm.nih.gov/books/NBK179276/pdf/Bookshelf_NBK179276.pdf. Accessed August 2024.

5. World Health Organization (WHO). Hypertension – Fact sheet. Available at: https://www.who.int/news-room/fact-sheets/detail/hypertension. Accessed August 2024.

6. Suni E, Wells A. Sleep Foundation. Orthopnea: causes, symptoms, and management. Available at: https://www.sleepfoundation.org/sleep-apnea/orthopnea. Accessed August 2024.

Glossary (cont'd)

Paroxysmal nocturnal dyspnoea: condition that triggers sudden shortness of breath during sleep.[1]

Stroke volume: amount of blood expelled with each heartbeat.[2]

Systolic dysfunction: impaired ventricular contraction; also known as systolic heart failure.[3]

Tachypnoea: rapid or shallow breathing.[4]

Type 2 diabetes: high level of blood glucose (sugar) that occurs when the body cannot effectively use the insulin it produces (insulin resistance). Approximately 95% of people with diabetes globally have type 2 diabetes.[5]

1. Zoppi L. Medical News Today. Paroxysmal Nocturnal Dyspnea. Available at: https://www.medicalnewstoday.com/articles/paroxysmal-nocturnal-dyspnea. Accessed August 2024.
2. Bacdrick A. TeachMePhysiology. Control of stroke volume. Available at: https://teachmephysiology.com/cardiovascular-system/cardiac-output/control-of-stroke-volume/. Accessed August 2024.
3. John Hopkins Medicine. Systolic heart failure. Available at: https://www.hopkinsmedicine.org/health/conditions-and-diseases/systolic-heart-failure. Accessed July 2024.
4. Cleveland Clinic. Tachypnea. Available at: https://my.clevelandclinic.org/health/symptoms/24124-tachypnea. Accessed August 2024.
5. World Health Organization (WHO). Diabetes – Fact sheet. Available at: https://www.who.int/news-room/fact-sheets/detail/diabetes. Accessed August 2024.

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