Nottinghamshire Heart Failure Guideline

Primary Care Referral and Management Considerations

The purpose of these guidelines is to provide guidance for Primary and Secondary Care on the diagnosis, management, and referral of patients with or suspected of having heart failure. There is a long version of the Nottinghamshire Heart Failure Guidelines available from the NUH website.

The aim is to support healthcare professionals in recognising heart failure, the urgency of referrals and in implementing expediently the best-evidenced treatment in an equitable manner to help care for this very high-risk population.

The **definition of 'specialist'** in this guideline is any healthcare professional who has undertaken an appropriate formal qualification or period of recognised training in heart failure or cardiology and who has working experience and knowledge in this area. It includes cardiologists, specialist nurses, pharmacists, HCOP physicians with an interest in heart failure and GPs with an interest in heart failure.

Resource Links:
British Society for Heart Failure: https://www.bsh.org.uk/
NICE guideline: https://www.nice.org.uk/guidance/ng106
ESC: https://www.escardio.org/Guidelines/Clinical-Practice-Guidelines/Focused-Update-on-Heart-Failure-Guidelines
Cardiorenal Forum: https://www.cardiorenalforum.com/
Palliative care guideline: https://www.nottsapc.nhs.uk/media/3gvbware/palliative-care-in-end-stage-heart-failure.pdf

Author: The guidelines have been written by Dr Bara Erhayiem, Consultant Cardiologist, Nottingham University Hospitals NHS Trust and further developed through the Nottingham Heart Failure Transformation Group, using the latest clinical research, evidence, and NICE/ESC guidance, considering our local structure, logistics and capacity.

<table>
<tr><th>Nottingham University Hospitals</th><th>Sherwood Forest Hospitals</th></tr>
<tr><td>Nottingham heart failure specialist consultant team:
Drs Bara Erhayiem, Amar Mistry, Jenny Chuen and Saima Khan</td><td>Heart Failure Lead Consultant Cardiologist:
Dr Ifti Fazal</td></tr>
<tr><td>Heart failure MDT referrals via:
Community and NUH heart failure nurse specialist team</td><td>Heart Failure Specialist Nurse Team
Gail Moore, Lynsay Hayes</td></tr>
<tr><td>NUH heart failure and general cardiology clinics:
• Referrals made via 'Electronic Referral System' (ERS).
• Consultants will vet into most appropriate service.

The patient will be vetted to service(s) depending on clinical urgency:
• Heart Function MDT Clinics
• Community HF MDT care
• Ambulatory HF Day-Case Unit: next working day
• Specialist HF echocardiography Clinic
• HF consultant Advice & Guidance
• General Cardiology Clinic

Referrals deemed urgent by consultant will be seen within 2 weeks</td><td>Referrals into the SFH service can be made via 'Electronic Referral System' (ERS).

The patient will be vetted to service depending on urgency:
• HF Consultant Advice & Guidance
• General Cardiology Clinic
• One Stop Heart Failure Clinic
• Community HF MDT care</td></tr>
<tr><td colspan="2">For non-urgent, simple, enquiries regarding patients not known to cardiology, 'Advice & Guidance' (A&G) can be used</td></tr>
<tr><td colspan="2">Urgent Clinical Queries go to:</td></tr>
<tr><td>Secondary Care</td><td>Community care</td></tr>
<tr><td>On-call cardiology team, via switchboard:
SFH Sherwood Forest Hospitals (01623 622515)
QMC Queens Medical Centre (0115 9249924)
City City Hospital Campus (0115 9691169)</td><td>Community Heart Failure Nurse Specialists:
Nottingham North, West, North & East: 0300 0830000
Rushcliffe: 0115 8440504
City: 0300 300 7995
Newark & Sherwood: 01623 781891
Mansfield & Ashfield: 01623 781891</td></tr>
<tr><td>Community speciality referrals</td><td colspan="2">HFrEF: Community heart failure team - to support ongoing cardiac therapy titrations and MDT support.
HFpEF: Community matron team (if available) - to support co-morbidity, frailty and diuretic management.
Community palliative care team for advancing heart failure and co-morbidity: see page 16.
Heart failure, pulmonary or cardiac rehabilitation referral for all patients, as available.
Community HCOP referral for patients with significant frailty and co-morbidities.</td></tr>
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Diagnosis & Referral

Clinical signs & symptoms that are suspicious of heart failure (***breathlessness, fatigue, oedema, etc)***

→ **Core workup:** FBC, U&E, LFT, NTproBNP, Transferrin SATs, Ferritin, TFT, HbA1c, Bone profile, Vit D, CXR, ECG, Blood Pressure, BMI and consider Spirometry

→ In the absence of more probable, alternative explanation of symptoms.

→ **Assess NTproBNP levels**

- **Heart failure unlikely** NTproBNP<400ng/L
- **Continue considering primary diagnosis of heart failure** NTproBNP<400ng/L to 2000ng/L
- **Likely heart failure and higher risk** NTproBNP>2000ng/L

→ Primary Care decision for echocardiography and/or NUH or SFH Cardiology input

→ Refer for **GP open access echocardiogram**, if required, at time of clinical diagnosis. **±** Referral made to 'Heart Failure Service' through the Electronic Referral System (ERS)

→ Referrals vetted by NUH and SFH Teams and assigned to one or more appropriate services.

Urgent clinical criteria for priority referral

- NTproBNP criteria in the absence of significant life-limiting extra-cardiac co-morbidity

- ***NTproBNP > 600ng/L if age < 50***
- ***NTproBNP > 2000ng/L if age < 75***
- ***NTproBNP > 2000ng/L if age >75 and in sinus rhythm***

Consider reducing the cut-off levels by 50% in BMI > 40kg/m2 and in patients on ACEi/ARBs.

- Suspicion of severe valve disease
- **Left bundle branch block**
- **Oedema** limiting mobility
- **Syncope on exertion** or with no prodrome
- **Pregnancy**; or planning pregnancy.
- **Awaiting urgent surgery**
- Undergoing **cancer treatment**
- **eGFR < 30mL/min**
- **Symptomatic hypotension or bradycardia**

Urgent management considerations at time of initial GP practice assessment and whilst waiting for echocardiography

DO	STOP	Advice to all patients:
- Offer loop diuretics if evidence of peripheral oedema, ascites, pleural effusions or raised JVP. - **Offer ACE-inhibitor or angiotensin receptor blocker** if has hypertension or CKD with proteinuria. - **Consider SGLT2 inhibitor if eGFR >30mL/min,** if patient has existing CKD or type II diabetes. - **Do not add beta blockers** prior to seeing echocardiogram results in absence of a firm non-heart failure indication. It can be clinically dangerous to prescribe beta-blockers without a diagnosis.	**- Stop or switch therapies that are harmful** in heart failure, including: • regular **NSAIDs**, • **glitazones**, • **rate-limiting calcium-channel blockers** (verapamil, diltiazem) • **venlafaxine.** - If blood pressure low, stop: • **oral nitrates** • **calcium-channel** • **alpha blockers**	- avoid sedentary behavior - encourage physical exercise appropriate to baseline fitness - reduce alcohol intake - stop smoking - limit dietary salt intake - avoid excess fluid intake - do not routinely advise long-term fluid restriction - diuretic education - 'Think Kidney' campaign; Sick-day rules for ACEi/ARB and SGLT2i - Optimisation of co-morbidities.

HF with Reduced LVEF (post echo)

Start 'quadruple' therapy in all patients ASAP with a left ventricular ejection fraction ≤ 40%, if no *absolute* contraindications. This can be done by GP practices and Community HF teams.

Patient Profile	Medications and dosing	Therapy guidance
Systolic BP > 100mmHg **+** **HR > 60bpm** **+** **Normal Sodium and Potassium** **+** **eGFR > 30mL/min**	**INITIATE:** • **Bisoprolol** 1.25mg OD • **Losartan** 25mg OD (ARB) **or Ramipril** 1.25mg OD (ACEi) • **Spironolactone** 25mg OD (MRA) • **Dapagliflozin 10mg OD (SGLT2i) – 1st line in Nottinghamshire** **or Empagliflozin 10mg OD**	**All therapies can start simultaneously at lowest doses and** - side-effect profiles are usually easily identifiable - this adds prognostic and symptomatic benefit **Reduce loop diuretics if the patient is not fluid-overloaded.** **Delay beta-blocker initiation until any severe fluid overload improves.** **Clinically review within 2 weeks.** For U&E, oedema and BP/HR check *Initial eGFR reduction of up to 33% can occur. If >33% then consider renal artery stenosis (outside of dehydration or worsening HF) and hold ACEi/ARB/MRA.*
Patients on pre-existing cardiac medicines ***New HFrEF patients may already be on medicines for angina, hypertension, chronic kidney disease.***	• **Continue pre-existing ACEi/ARB or up-titrate.** • If on a **beta-blocker** other than bisoprolol, carvedilol or nebivolol (licensed for HFrEF), **switch to equivalent dose bisoprolol.** • **Statin** - If myocardial infarction suspected on echo, convert to secondary prevention dose.	**Focus on the addition of new HF therapies to complete 'quadruple' care**, rather than titration alone of pre-existing medicines.
Already on ACEi/ARB **+** **Systolic BP > 100mmHg**	Consider **Sacubitril/Valsartan to replace ACEi/ARB** ACEi therapy must be discontinued **at least 36 hours before initiation** of sacubitril/valsartan due to risk of angioedema from concurrent therapy.	Cardiologists or community HF specialists may advise sacubitril/valsartan early or first-line in selected patients. **Clinically review within 2 weeks.** For U&E, oedema and BP/HR check
Resting HR < 60bpm	**Don't offer beta-blocker if HR<60.**	Continue with initiating other therapies as indicated.
Symptomatic low BP or postural hypotension	**Avoid**: • *Initial* ACEi/ARB and beta-blocker • Sacubitril/valsartan **Give:** • Spironolactone 25mg OD • Dapagliflozin **(1st line)** or Empagliflozin 10mg OD	**Clinically review within 2 weeks** for U&E and BP/HR check to consider ACEi/ARB or beta-blocker. **At these doses, SGLT2i and MRA do not cause hypotension**.
eGFR < 30mL/min	**Avoid initiating ACEi/ARB, MRA and SGLT2i.** **Give Bisoprolol** 1.25mg OD.	**Early Secondary Care opinion needed** via A&G.
Potassium > 5.5mmol/L	**Avoid initiating ACEi/ARB and/or MRA** **Give Bisoprolol** 1.25mg OD **Give** Dapagliflozin **(1st line)** or Empagliflozin 10mg OD	**Clinically review within 2 weeks** For U&E, oedema and BP/HR check **Advise low potassium diet**. **Early HF team** opinion if persistently raised
Patients with T2DM on insulin and/or sulphonylurea	**INITIATE:** **Dapagliflozin (1st line) or Empagliflozin** 10mg OD (Amber3 as per T2DM guideline)	Refer to T2DM guidance, taking into account most recent HbA1c and usual glucose levels. **If diabetes is already well controlled**, consider either stopping sulphonylurea and/or reducing insulin by 10% as you start SGLT2i. If unsure, rather than not offering SGLT2i, seek advice from diabetes specialist nurse or community/ Hospital HF team.

HF with preserved LVEF

Diagnostic criteria	Common comorbidities	Medications and dosing	Therapy guidance
Clinical features of heart failure with: **Raised NTproBNP** **LV ejection fraction >45%** and any of the following; **Dilated atria** **Ventricular hypertrophy** **Diastolic dysfunction** Can use HFpEF clinical scoring system: H2FPEF. Comorbidity burden is often high and drives additional healthcare needs and hospitalization.	• Obesity • Metabolic syndrome • Type II diabetes • Atherosclerosis • AF • HTN • Anaemia • Smoking history • CKD • liver disease • Elderly • COPD • Sleep apnea **Screening for** and **treating co-morbidities** is vital in managing patients with HFpEF,	**CONSIDER:** • **Dapagliflozin (1st line) or Empagliflozin** 10mg OD • **Spironolactone** 25mg OD, especially if HTN or obesity . • Reduction of other polypharmacy.	**Loop diuretic titration to maintain euvolaemia** (including reducing if the patient is not fluid overloaded) **Avoid beta-blockers unless a strong non-heart failure indication.** **Conservative BP targets for HTN**. Physical rehabilitation and regular aerobic activity Screen for COPD and Obstructive Sleep Apnoea and investigate if clinically indicated. **Clinically review within 2 weeks.** For U&E, oedema and BP/HR check
Persistent/Permanent Atrial fibrillation		• **Digoxin preferred** • Consider weaning off beta-blockers if HR < 70bpm.	**Aim HR<110bpm** at rest (not a strict target).
Patients on pre-existing cardiac medicines ***New HFpEF patients may already be on medicines for angina, hypertension, chronic kidney disease.***		• **Continue pre-existing ACEi/ARB or up-titrate** • **Statin** - If myocardial infarction suspected on echo, convert to secondary prevention dose	Currently there is **no clear evidence** that any specific treatments for HFpEF reduce the risk of mortality **Rapid 'quadruple' heart failure therapy is not advised and may even be harmful**.

	Diagnosis consideration	Patient Profile in suspected HFpEF
Early cardiology referral	Needs specialist input and workup	**Any patient aged < 40:** +/- positive family history +/- features of shunt +/- features of pulmonary hypertension +/- normal ECG
	'Possible' HFpEF	• **Age 40 to 65 AND** • **No typical HFpEF comorbidities**
Early cardiology referral	Constrictive Pericarditis	• Previous TB, pericarditis, cardiac surgery, chest radiotherapy • Severe fluid overload with NTproBNP <1000ng/L • Ascites, liver dysfunction with normal albumin • Raised venous pressures with 'normal' echo
Early cardiology referral if no suspicion of myeloma	Cardiac Amyloidosis	• History of carpal tunnel syndrome • Small QRS complexes on ECG despite LVH on echo • Autonomic and peripheral neuropathy • Sensitive to BP lowering medications • Urgent free-light chains and immunoglobulins recommended • Follow local free-light chain interpretation guidance

Diuretic Management

> 95% of patients are fluid overloaded at time of symptomatic heart failure diagnosis.
Advise no excess dietary salt intake or excess fluid intake.

Aim to maintain patient on the lowest dose of loop diuretic required to maintain comfortable euvolaemia.
Assess for diuretic titration at every clinical interaction to avoid hypovolaemia/dehydration.

Possible Clinical Scenarios	Diuretics	Prescribing guidance
Signs of fluid overload	• **Furosemide 20-40mg once to twice daily,** titrating as needed up to 120mg BD	**Diuretic titration to maintain euvolaemia** (including reducing if the patient is not fluid overloaded) **An increase in diuretic should be considered when:** • Increase in weight of ≥2kg over 2-3 days. • Increased dyspnoea, oedema, ascites, orthopnoea. **A decrease in diuretic should be considered when:** • Stable and mild dyspnoea with no oedema, ascites, orthopnoea. • Specific symptoms of dehydration (eg thirst, very dry mucous membranes and decreased skin turgor, postural hypotension). U&E should be repeated 1 to 2 weeks after diuretic dose changes. As heart function therapies are initiated, the need for diuretics often decreases. Clinicians should wean diuretics down to lowest possible maintenance dose at every opportunity to avoid hypovolaemia, hypotension and pre-renal acute kidney injury. It is encouraged to **empower** patients and teach them to record their own weight and symptoms frequently and **self-titrate** loop diuretics.
Still symptomatic on furosemide 120mg BD	• Consider switching to **bumetanide** • 40mg furosemide = 1mg bumetanide • Bumetanide has greater and more consistent bioavailability than furosemide.	
Sodium > 135mmol/L	• Early supplementation with **bendroflumethiazide** (or **metolazone)** 2.5mg - 5mg from once weekly to once daily (at midday) *Metolazone is classified **Red** - only for specialists to prescribe.*	
In patients on ACEi/ARB	• **Increase Spironolactone** or **Eplerenone** to 50mg OD *Eplerenone is classified **Amber2** – specialist recommendation/initiation.*	
In patients NOT on ACEi/ARB	• **Spironolactone** up to 200mg daily in response to symptoms	
If intolerance to spironolactone or eplerenone.	• **Amiloride** 5-10mg BD	
Falling eGFR and **low sodium**	• Common findings in fluid overload • Care to not misinterpret findings as reason to not offer diuresis.	**Aim sodium >125mmol/L** if symptoms improved and oedema controlled.
Ambulant community HF patient has increasing symptoms and fluid overload **DESPITE** **>80mg furosemide** **or >2mg bumetanide BD**	**NUH** **Urgently call the 'NUH heart failure team' via NUH switchboard to consider day-case unit attendance for ambulatory intravenous furosemide therapy.**	**SFH** **Not available at SFH.**

Advanced Heart Failure

Patients with advancing heart failure often benefit from **palliative care *alongside* active care.**

Two of the following conditions could indicate that a patient may be included within your Palliative Care Register:
1. **Severe breathlessness despite optimal medical therapy**
2. Question: "would I not be surprised if this patient died in the next 6-12months"?
3. **Repeated heart failure hospital admissions**
4. **Difficult physical or psychological symptoms** despite optimal tolerated therapy

Notts APC HF palliative guideline: https://www.nottsapc.nhs.uk/media/3gvbware/palliative-care-in-end-stage-heart-failure.pdf

Heart Failure with reduced Ejection Fraction: core therapies

Heart Failure Medication	Starting Dose	Target Dose	Titration steps	Ensure			
				Heart Rate > 50bpm	Systolic BP > 110mmHg	Potassium <5.5mmol/L	eGFR reduction <33%
Beta-blocker: **Bisoprolol**	**1.25mg once daily**	**10mg once daily** Or 5mg BD if OD not tolerated	**1.25mg - increase every 2 weeks**	√	√		
ACE-inhibitor: **Ramipril**	**1.25mg once daily**	**10mg once daily** Or 5mg BD if OD not tolerated	**1.25mg - increase every 2 weeks**		√	√	√
Angiotensin Receptor Blocker (ARB): **Losartan**	**25mg once daily**	**150mg once daily**	**50mg - increase every 2 weeks**		√	√	√
Aldosterone Antagonist (MRA): **Spironolactone** or **Eplerenone**	**25mg once daily**	**50mg once daily**	**25mg - increase at 4 weeks**		Doesn't cause hypotension at these doses.	√	√
SGLT2 inhibitor: **Dapagliflozin** (1st line) or **Empagliflozin**	**10mg once daily**	**10mg once daily**	**Do not give in Type I Diabetes**		Does not cause hypotension at these doses.		√
Neprilysin inhibitor and ARB: **Sacubitril/ Valsartan**	**24/26mg twice daily**	**97/103mg twice daily**	**Double dose every 2-4 weeks**		√	√	√

Heart Failure with reduced Ejection Fraction: Adjunct Therapies

Heart Failure Medication	Indication	Starting Dose	Titration or referral steps
Ivabradine (Amber2)	Symptomatic HF with LVEF < 35% On beta-blocker Sinus rhythm Heart rate > 75bpm and BP > 90mmHg	**HF specialist opinion first** 2.5mg twice daily	2.5mg increase every 2-4 weeks Target heart rate <75bpm Ensure systolic BP > 90mmHg Maximum dose 7.5mg twice daily
Digoxin	Worsening HF despite optimal therapy. Whether patient in AF or sinus rhythm	**HF specialist opinion if in sinus rhythm.** 62.5mcg once daily if in AF	Maintenance dose usually 125mcg OD
Nitrate/ Hydralazine (Amber2)	Worsening HF despite optimal therapy Especially if African/Caribbean And/or ACEi/ARB dosing limitation And/or if severe hypertension	**HF specialist opinion first.** ISMN MR 30mg OD Hydralazine 25mg TDS	Titrate to symptoms; maximum dosing ISMN MR 120mg once daily Hydralazine 75mg three times daily
Potassium Binder: **Sodium Zirconium Cyclosilicate** (Amber 2)	If persistent hyperkalaemia Serum potassium > 5.5mmol/L Despite low potassium diet If limiting ACEi/ARB/MRA optimisation	**HF specialist opinion first.** 10g TDS loading dose for up to 72 hours, followed by maintenance dose 5g OD	Titrate to potassium levels; Maintenance dose range: 5g alternate day to 10g once daily
Intravenous Iron (Red)	Symptomatic HF with LVEF < 45% Ferritin <100mcg/L Ferritin 100-300mcg/L if TSATs < 20%	N/A	IV Iron Referral Form to NUH HF Team Refer for IV Iron to KMH via Community HF Nurses. Check bone profile and vitamin D