Confirmed Heart Failure Primary Care Pathway

Quick links: Pathway primer | Expanded details | Provider resources | Patient resources

1. Assess patient

- Clarify reason for visit: Post-hospitalization or ER visit -- decompensation -- stable follow up
- Ask patient: Symptoms better/worse/same
- Check patient: Heart rate and rhythm, blood pressure, fluid status (weight, peripheral edema, JVP, basal crepitations

2. Rule out:

Alarm features:
- Signs of MI or PE
- Struggling to breathe
- Prolonged chest pain
- Fainting
- Confusion

Present → Call RAAPID or 911

Red flag features:
- Worsening dyspnea, PND, +/- orthpnea
- Increased edema
- Weight gain (2kg in 2 days or 2.5kg in 1 week)
- Resting HR greater than 100bpm +/- change in rhythm
- If patient symptoms not improving within 2 visits
- Lightheaded or postural symptoms or systolic BP less than 90mmHG
- Fatigue with less exertion

Present → Tele-advice or continue on pathway; Specialist Link

No alarm features or red flags

3. Confirm diagnosis and review investigations

ECHO with documented LVEF, NT-proBNP, creat, GFR, lytes, ferritin, thyroid hormone

4. Pharmacotherapy

Based on diagnosis, investigations and treatment goals (table 1)

Table 1 | Medication titration

Diuretic, if volume overload, minimum dose to maintain euvolemia

LVEF less than or equal to 40%:
Evidence-based pharmacotherapy: Initiate medications and titrate to target dose (or maximum tolerated dose)
- SGLT2i
- ACEI/ARB or ARNI*
- BB +/- SNI*
- MRA

*ARNI and SNI require specialty to initiate

LVEF greater than 40%:
Symptom-based pharmacotherapy to treat underlying cause/symptoms of heart failure
- SGLT2i
- + MRA
- ACEI/ARB
- +/- BB (for angina, post MI, tachychardia

5. Identify, optimize management of comorbidities

6. Self management, lifestyle modifications

Table 2

7. Follow up: When, who and how to refer?

- Plan for follow up (based on clinical situation; min q3 months)
- Review when/where to refer (speciality +/- community resource
- Advanced care planning discussion, goals of care completed, reviewed

PATHWAY PRIMER

Heart failure (HF) is a clinical syndrome characterized by myocardial damage, abnormal systolic and diastolic function, exercise intolerance and fluid retention. Patients with a diagnosis of heart failure have a high symptom burden and impact on quality of life, as well a high risk of hospitalization and mortality.

Heart failure (HF) affects approximately two per cent of adults, with close to 6,000 in-patient HF admissions per year in Alberta. The goals of HF treatment are to prolong active, independent life by reducing symptoms and delay the progression of the underlying heart dysfunction.

Appropriate HF management and the support of HF patients in the community are critical to optimizing patient outcomes and minimizing the strain on the health care system. HF care in Alberta is suboptimal with less than 2/3 of patients receiving assessment of left ventricular (LV) function and less than 40 per cent being jointly followed by primary health care and specialist care, although both LV assessment and joint care plans are well evidenced clinical practices. Canadian Cardiovascular Society (CCS) HF Guidelines state that optimal HF care occurs when both primary health care and specialized HF teams are involved in the care of these critically ill patients. Data from Alberta support the CCS HF recommendation that patients seen by both a family physician and a specialist are more likely to have better one-year mortality than those cared for by a family physician alone.

Even though treatment for heart failure has improved, our aging population and improved treatment of acute cardiovascular disorders has led to a steady increase in the prevalence of heart failure. New advancements in management continue to transform the treatment of heart failure, but evidence has repeatedly shown that dissemination of these treatments into the general population occurs very slowly or not at all. This includes poor access to both new and older evidence-based medications, as well as poor initiation/adherence to disease management approaches which have been shown to work.

The clinical course of patients with HF is one of repeat emergency department visits, hospital readmissions, and high mortality. Consequently, HF readmissions are recognized as a major health care problem. Frequent users of healthcare services represent a relatively small group of patients who account for a disproportionately large amount of healthcare utilization, including emergency department visits.

After discharge, 25% of HF patients are readmitted within the first 30 days, and 50 per cent within the first six months. Prompt follow-up of patients with HF has been associated with lower rates of death and readmission, and 30-day follow-up has been included as a quality-of-care indicator in Canada. A fully integrated project combining optimized inpatient care with enhanced transition services, such as integrated plans of care, enhances referral and communication between care providers thereby improving outcomes for patients with HF.

There were significant changes in heart failure care that originally prompted the development of this pathway. These include:

a) Evidence to support the need for EARLY follow up of patients by primary care within 7-10 days post discharge from hospital or ED visit with Heart Failure Diagnosis or symptoms. This timely follow up has been shown to lower rates of readmission and death.
b) Critical need to OBTAIN and DOCUMENT both LVEF and NT-proBNP at the time of diagnosis in patients with HF in order to stratify their medications and support follow up with specialist care.

c) Pharmacological treatment updates for both HFrEF, and HFpEF including:

- Recent (2021) CCS guidelines for the management of HF define a new standard of pharmacologic care for HF with reduced ejection fraction (HFrEF) that incorporate 4 key therapeutic drug classes as standard therapy for most patients. These foundational Guideline Directed Medical Therapies (GDMT) include angiotensin receptor neprilysin inhibitor (ARNI) or angiotensin converting enzyme inhibitor (ACEI)/angiotensin receptor blocker (ARB), mineralocorticoid receptor antagonists (MRA), Beta-Blockers (BB), and Sodium-Glucose Cotransporter-2 Inhibitors (SGLT2i).
  - Currently, in Alberta, prescriptions for Angiotension receptor-neprilysin inhibitor (ARNI) and Sinus node inhibitor (SNI) must be initiated by a specialist in Internal Medicine or Cardiology. Once initiated, dose adjustments and prescribing may be done without specialist involvement.
- Sodium-Glucose Cotransporter-2 Inhibitors (SGLT2i) for patients with preserved ejection fraction (HFpEF), regardless of the presence or absence of diabetes is now indicated.

Care for patients with Heart Failure is complex. Clinical pathways have been shown to improve access to evidence-based medical care for patients with heart failure and, when introduced, have been shown to be associated with improved outcomes. This pathway has been developed by the Calgary Zone Primary Care Networks in partnership with the Section of Cardiology and Alberta Health Services. These local guidelines are based on best available evidence, current local resources and are practical in a primary care setting. The pathway is designed to contain all critical elements of the heart failure visit, which are laid out in a manner that will mirror most clinical interactions, and therefore support care for the patient in the medical home.

This package includes: a focused summary of HF relevant to primary care; a checklist to guide your in-clinic patient review; links to additional resources for this specific condition and a clinical flow diagram with expanded detail.

Heart failure is best managed using a team approach. In particular post hospitalization follow-up, teaching the basics of HF management including self-management and medication titration can occur in a variety of settings and involve members of the multidisciplinary team.

Finally, follow up with BOTH specialist and primary care following hospital discharge is associated with a 39 per cent lower rate of death or repeat hospitalization. Collaboration between primary and specialty care is key.

EXPANDED DETAIL

1. SAFETY VISIT- POST HOSPITALIZATION OR ER VISIT (7 DAYS POST DISCHARGE)

Available Canadian-based evidence indicates a benefit of early follow up to patients discharge from hospital for acute heart failure, whether from an ED or in-hospital setting.

- Follow- up with any physician during the first 7 days post discharge is associated with a 15% lower rate of death or readmission when compared to follow up within the first 30 days (estimated NNT of <10)[1]
- Follow up with a familiar physician is associated with an additional 5-10% lower rate of death or readmission as compared to a non-familiar physician[2]

  For these reasons, several societies now recommended early follow up of patients with acute heart failure who are discharged from an acute care facility, and that appointments be made (with the primary care provider) prior to their discharge.
- Patients should be advised regarding self-monitoring (see Table 2), as well as advice about when to be seen (patient handout). This will hopefully allow for patients to identify symptoms/signs of decompensation early, so that follow up may occur within the medical home.

2. HEART FAILURE: RISK FACTORS, SYMPTOMS AND SIGNS

Most Common risk factors for HF:

- Hypertension
- Ischemic heart disease
- Cardiomyopathy
- Obesity and/or diabetes
- Cardiac arrhythmia
- Valvular heart disease

Symptoms of HF (Diagnosis suspected/known or decompensation of HF):

- Breathlessness at rest or on exertion
- Orthopnea
- Paroxysmal nocturnal dyspnea (PND), defined as awakening from a recumbent position due to dyspnea with resolution of symptoms with rising to the upright position
- Peripheral/dependent edema
- Fatigue
- Confusion (particularly in elderly patients)

Signs of HF (Diagnosis suspected/known or decompensation of HF):

- Bilateral pitting edema
- Weight gain (over 2-5 days)
- Basal lung crackles/crepitations
- Elevated JVP or positive abdominojugular reflex
- Elevated HR (>100)
- Hypoxemia in severe cases
- Tachypnea

3. ESSENTIAL HF INVESTIGATIONS: ECHO, NT-PROBNP; CR,GFR,LYTES

- **Echocardiography (ECHO): Echocardiography with documented left ventricular ejection fraction (LVEF).**
  - The documentation of LVEF is ESSENTIAL and ECHO's should only be ordered from providers who include documentation of LVEF BY NUMBER in the ECHO report. Echocardiography with documented LVEF should be ordered at the time of suspected HF diagnosis (either in acute care setting or community), during hospitalization for decompensated HF or if the last echocardiogram was done more than 2-3 years prior (or if LVEF has not been documented).
  - The documentation of LVEF allows for heart failure to be classified into the following two subgroups:
    - Heart failure with reduced ejection fraction (HFrEF) when the echocardiogram reports a left ventricular ejection fraction of less than or equal to 40%
    - Heart failure with preserved ejection fraction (HFpEF) when the echocardiogram reports a left ventricular ejection fraction of greater than 50%- HOWEVER those with LVEF 41-50% are treated the same as those for HFpEF, so, for this pathway, we consider ANY LVEF greater than 40% to mean HFpEF.
  - The term "recovered EF" has also been added to the literature, referring to patients who previously had HFrEF and now have an EF > 40%. Regardless of current EF, treatment decisions and the addition of new evidence based therapies should be added, based on lowest EF. For example - assume a patient had an EF of 35% on diagnosis 4 years ago. At that time, they were treated with recommended evidence based therapies for HFrEF. EF is now 50% and the patient is asymptomatic. Continue treating the patient with the recommended HFrEF medications and also add the newer evidence based therapies (example SGLT2) to the current treatment regime.[3]
- **NT-proBNP:** NT-proBNP (N-terminal pro-Brain Natriuretic Peptide) or BNP (Brain Natriuretic Peptide) are naturally occurring peptides released by heart ventricles. These tests are useful in the diagnosis of heart failure, determination of severity of heart failure and for prognostication. In the Calgary Zone, NT-proBNP is available for testing. It is important to note that these values correspond to decompensated heart failure and do not apply when heart failure is stable. For this reason, we do NOT recommend routinely measuring NT-proBNP after a diagnosis of heart failure has been established. The following are exceptions:
  - For outpatient risk assessment when referring to a heart failure clinic (as long as not already done in the preceding three months).
  - At hospitalization and 24-48 hours prior to hospital discharge to help determine referral to a HF clinic. In addition, in Alberta, certain evidence-based medications, such as sacubitril/valsartan (ARNI) will not be covered by Alberta Bluecross without a measurement of Natriuretic Peptides (this can be within the previous few months).

	Age, Years	HF is Unlikely	HF is Possible but Other Diagnoses Need to be Considered	HF is Very Likely
Acute setting				
BNP	All	<100 pg/mL	100-400 pg/mL	>400 pg/mL
NT-proBNP	<50 50-75 >75	<300 pg/mL <300 pg/mL <300 pg/mL	300-450 pg/mL 450-900 pg/mL 900-1800 pg/mL	>450 pg/mL >900 pg/mL >1800 pg/mL
Ambulatory care setting				
BNP NT-proBNP	All All	<50 pg/mL <125 pg/mL		

Reference: Ezekowitz J et al. Can J Cardiol 2017; 33: 1342-1433, p 1355

IMPORTANT: an NT-proBNP under 300 does not rule out a diagnosis of STABLE HF. The above values apply for SUSPECTED NEW DIAGNOSIS OR DECOMPENSATED HF.

- **Creatinine/GFR, and electrolytes**-regular monitoring to establish baseline and guide pharmacotherapy

Additional investigations in HF depending on clinical situation:

- ECG- ascertain HR and rhythm, rule out ongoing ischemia, assess ?prior infarct/bundle branch block
- CXR-PA/Lat-particularly helpful in assessing cardiomegaly, vascular redistribution, pleural effusion, pulmonary edema. May also consider if looking for concurrent or alternate explanation of symptoms
- Creatinine/GFR, electrolytes-essential lab investigations for patients with HF
- BUN-may be helpful if clinical question of volume depletion
- CBC-helpful for many aspects of care including identifying anemia (which may exacerbate HF)
- Glucose-consider in context of patient (comorbidities/infection)
- TSH-hyperthyroidism may cause and/or aggravate HF. Hypothyroidism causes HF only with severe cases of myxedema. Treatment of thyroid condition will reverse/improve HF.
- Ferritin – Anemia should also be treated accordingly with oral or IV iron therapy (depending on the ferritin value) or epoeitin therapy (depending on Hgb) depending on the severity.

HF INVESTIGATIONS SUMMARY: In addition to **chest radiograph**, the following summarizes the minimum diagnostic tests for HF (if not already completed):

ECG	• Heart rhythm • Heart rate	• QRS morphology • QRS duration	• Q waves • Atrial Fibrillation (AF)	• LV hypertrophy • Left bundle branch block (LBBB)
BNP/NT-pro-BNP (when available)	• Elevate as per local values while considering age and sex • Recommend as additional diagnostic criterion for HFrEF and HFpEF			
Echocardiography	• Ejection fraction • Left anterior size	• Ventricular systolic and diastolic function	• Left ventricular hypertrophy • Right ventricular systolic pressure	• Valvular abnormalities
Blood tests	• CBC • Creatinine	• Thyroid hormone • Electrolytes	• Hemoglobin • Ferritin	

Reference: Ezekowitz J et al. Can J Cardiol 2017; 33: 1342-1433

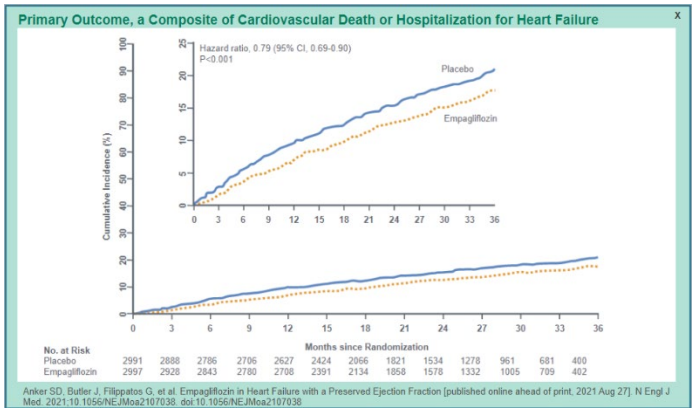
4. PHARMACOTHERAPY

- **Diuretics**: are used in the same manner for either HFrEF or HFpEF if patient is volume overloaded (increased weight, edema, increased JVP, crackles/rales). Initiate diuretics and titrate as necessary as per instructions in Table 1. Use the minimum dose required to maintain euvolemia.

Heart failure may occur with any degree of left ventricular ejection fraction. However, treatment targets and evidence for therapies is based on whether LVEF is documented as 40% or less (HFrEF) or greater than 40% (HFpEF).

- **HFpEF:** Therapies have also been shown to mediate definite, but less significant effects in patients with heart failure and LVEF that is preserved (greater than or equal to 40%). For patients with HFpEF, the goal of therapies is SYMPTOM-BASED. In patients with HFpEF, these therapies have NOT been shown to reduce mortality or to improve LVEF. (see Table 1).
- CCS Guidelines for HF for HFpEF place a high value on the known etiologic factors for HF with a preserved EF and less on known outcome-modifying treatments which, unlike in HFrEF, are still limited but do include loop diuretics and SGLT2i as strong recommendations. Additional recommendations are included below:
    1. Treat underlying cause if apparent (e.g., Ischemic Heart Disease (IHD), valvular heart disease).
    2. Identification and treatment of comorbid conditions which may exacerbate the HF syndrome.
    3. Systolic/Diastolic hypertension is to be controlled according to current CHEP hypertension guidelines to prevent and treat HFpEF (Strong Recommendation, High Quality Evidence).
    4. Treat fast or slow HR, especially AF - consider rhythm control vs rate control (beta-blockers (BB) or nondihydropyridine calcium-channel blockers (ND-CCB) as the first-line rate control agent, digoxin is reserved as adjunctive therapy for patients unable to achieve HR targets with BB or ND-CCB) (Cheung et al, 2021 https://www.sciencedirect.com/science/article/pii/S0828282X21003135?via%3Dihub).
    5. Prevent arterial thromboembolism, particularly stroke – see the CHADS-65 CCS Algorithm page 15
    6. Loop diuretics can be used to control symptoms of congestion and peripheral edema (Strong Recommendation, Moderate Quality Evidence).
    7. SGLTi (Strong Recommendation). Review the EMPEROR - Preserved: Empagliflozin Outcome Trial [Anker 2021]
    8. ACEI, ARB, MRA (Weak Recommendation). Review the HFpEF Pharmacological Treatment page 10
    9. ARNI (No recommendation). Sacubitril-valsartan did not result in a significantly lower rate of total hospitalizations for heart failure and death from cardiovascular causes in HFpEF patients in the Global Outcomes in heart failure with preserved ejection fraction (PARAGON-HF) trial (Solomon SD et al., 2019)
- **HFpEF Pharmacological Summary:**
    - **Diuretics:** Strong Recommendation
    - **SGLT2i:** Strong Recommendation.
        - The 2021 Empagliflozin outcome trial (EMPEROR-Preserved) evaluated the effects of empagliflozin on major heart failure outcomes in patients with an EF >40%. Until this trial (2021), HF patients with an EF >40% have had no clinically proven treatments that made a significant impact on their condition.

- In this clinical first for adults HF with an EF >40%, SGLT2 inhibition with empagliflozin led to:
  - a 21% risk reduction in cardiovascular death or hospitalization



  - reduced risk of first and recurrent hospitalizations for heart failure by 29% and significantly slowed kidney function decline
  - a statistically significant reduction in total number of hospitalizations for heart failure and a longer time to first hospitalization for heart failure
- The benefit was independent of ejection fraction or diabetes status, establishing empagliflozin as the first and only treatment to significantly improve outcomes for the full spectrum of heart failure patients.

- **ACEI or ARB:** have been shown to improve symptoms of heart failure and exercise tolerance and modestly reduce hospitalization for heart failure. Start with lowest dose and target treatment to BP less than 130 systolic. See Table 1 for dosing and instruction.
- **MRA:** consider initiating if stable on ACEI/ARB and diuretic. Has been shown to improve symptoms of heart failure and exercise tolerance and modestly reduce hospitalization for heart failure. Start with lowest dose only in patients with serum potassium of less than 5.0mmol/L and GFR greater than or equal to 30. If is important to monitor creatinine, GFR, and electrolytes with MRA's as they may cause life-threatening hyperkalemia and/or renal insufficiency. See Table 1 for dosing and instruction.
- **Beta-blockers:** not recommended unless needed for HR regulation or additional BP lowering. See Table 1 for dosing and instruction.

- **HFrEF:** Patients with low LVEF (less than 40%) have been well studied. For patients with HFrEF, there are several EVIDENCE-BASED therapies that have been shown to improve LVEF, heart failure symptoms, exercise tolerance, and quality of life. These therapies have also been shown to reduce hospitalization and mortality. For patients with HFrEF, **the EVIDENCE-BASED** treatment goal is to initiate medication and titrate to target dose (or maximum tolerated dose) to improve symptoms, hospitalizations and survival. (see Table 1).
  - Recent (2021) CCS guidelines for the management of HF define a new standard of pharmacologic care for HF with reduced ejection fraction (HFrEF) that incorporate 4 key therapeutic drug classes as standard therapy for most patients. These foundational Guideline Directed Medical Therapies (GDMT) include:
    - **ACEI or ARB (if ACEI intolerant) or ARNI (needs to be initiated by specialty):** if not already on, initiate while diuretic therapy is being optimized. Start with lowest dose and titrate to target dose (or maximum tolerated dose) as per instructions in Table 1. **Once initiated, does not require specialist to re-start or alter the dose.**

- **Beta-blocker (BB):** initiate when stable on ACEI/ARB or ARNI ± diuretic. May initiate sooner if needed for heart rate regulation. Start with lowest dose and titrate to target dose (or maximum tolerated dose) as per instructions in Table 1.
- **Mineralocorticoid Receptor Antagonists (MRA):** May initiate with above medications in patients with serum potassium less than 5.0 mmol/L and GFR greater than or equal to 30. Start with lowest dose and titrate to target dose (or maximum tolerated dose) as per instructions in Table 1. It is important to monitor creatinine, GFR and electrolytes with the MRA's as they may cause life-threatening hyperkalemia and/or renal insufficiency.
- **Sodium-Glucose Cotransporter-2 Inhibitors (SGLT2i):** An SGLT2 inhibitor, such as dapagliflozin (DAPA-HF study [McMurray 2019]) or empagliflozin (EMPEROR-Reduced study [Packer 2020]), should be used in patients with HFrEF, with or without concomitant type 2 diabetes, to improve symptoms and quality of life and to reduce the risk of HF hospitalization and/or CV mortality.

- **Secondary HFrEF Medication:**
  - **Sinus node inhibitor (Ivabradine):** may be initiated (**needs to be initiated by specialty**) if patient is in sinus rhythm and heart rate is at least 75 beats per minute despite target dose (or maximum tolerated dose) of beta-blocker. May also be used in patients who are unable to tolerate beta-blockers. Not useful for patients in atrial fibrillation. **Also does not require specialist to re-start or alter dose.**

- **HFrEF Treatment Algorithm summary:**

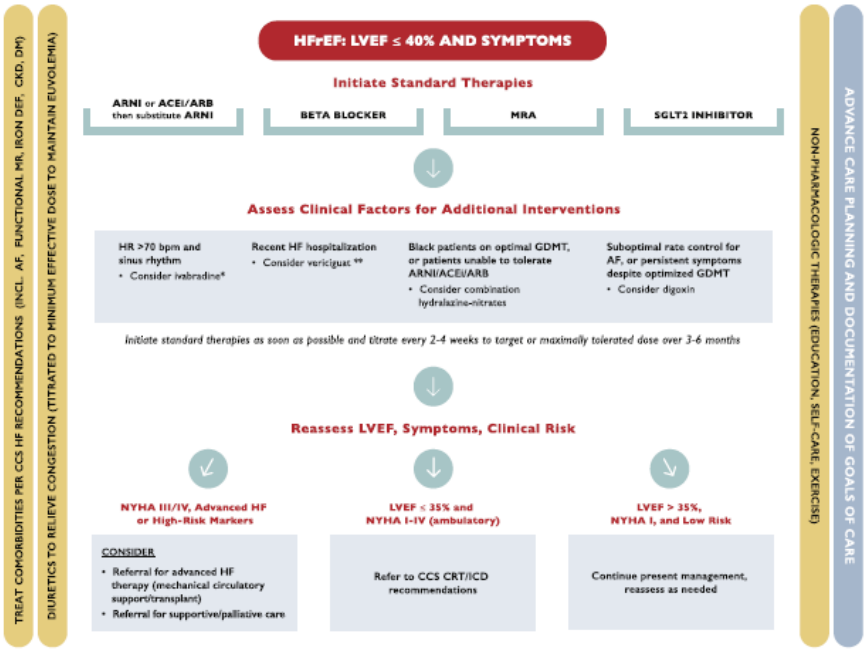


Figure 1. Simplified treatment algorithm for management of heart failure (HF) with reduced ejection fraction (HFrEF). Standard therapies are applicable to most patients with HFrEF for reducing cardiovascular mortality and hospitalization for HF. Additional, pharmacologic therapies should be individualized on the basis of clinical factors as outlined in the text. Every attempt should be made to initiate and titrate therapies with the goal of medication optimization by 3-6 months after a diagnosis of HFrEF. Throughout the patient journey, nonpharmacologic therapies should be prescribed, along with judicious use of diuretics to maintain euvolemia. Evidence also supports interventions to treat important comorbidities including iron deficiency, atrial fibrillation (AF), and functional mitral regurgitation (MR) in selected patients. ACEI, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; ARNI, angiotensin receptor-neprilysin inhibitor; CCS, Canadian Cardiovascular Society; CKD, chronic kidney disease; CRT, cardiac resynchronization therapy; DM, diabetes mellitus; GDMT, guideline-directed medical therapy; ICD, implantable cardioverter defibrillator; LVEF, left ventricular ejection fraction; MRA, mineralocorticoid receptor antagonist; NYHA, New York Heart Association; SGLT, sodium glucose transport. * Health Canada has approved ivabradine for patients with HFrEF and heart rate (HR) ≥ 77 bpm in sinus rhythm. ** Vericiguat is not yet approved for use in Canada.

[McDonald et al. CCS/CHFS Heart Failure Guidelines Update: Defining a new pharmacological standard of care for heart failure with reduced ejection fraction. *CJC* 2021; 37: 531-546]

TABLE 1: Evidence based heart failure therapies

Medication	Treatment goal	Start Dose (mg unless otherwise specified)	Target dose	Interval for titration	Monitoring and tests to guide titration	Comments
Evidence based heart failure therapies						
Diuretics						
Loop Diuretics (addition of thiazide in diuretic resistant cases)	HFrEF & HFpEF: symptoms and signs of congestion; Maintain euvolemia and assist in volume regulation	Furosemide 20 mg daily Metolazone 2.5 mg HCTZ 12.5 mg or 25 mg daily	As per response. Caution with increasing dosage. Use minimum dose to maintain euvolemia.	Variable, as needed to control volume only	electrolytes, creatinine	High risk of electrolyte abnormality when concomitant/combination diuretic changes; Consider re-evaluation of diuretic strategy when total daily loop dose >160- 200 mg/day
ACEI						
Captopril	HFrEF: Improve LVEF and treat hypertension HFpEF: treat hypertension	6.25mg TID	50 mg TID	Titrate 2 weeks (increase dose 50-100%)	BP, electrolytes and creatinine 7-14 days after medication is initiated and with each dose adjustment.	Note: ACEI or ARB (ARB if intolerant to ACEI-ARBs not superior
Enalapril		1.25-2.5mg BID	10-20 BID in NYHA class IV			
Fosinopril		10 mg daily	40 mg daily			
Lisinopril		2.5-5mg daily	20-35 mg daily			
Perindopril		2-4 mg daily	4-8mg daily			
Quinapril		5 mg daily	20 mg BID (40 mg daily max)			
Ramipril		1.25-2.5 mg BID	5 mg BID			
Trandolapril		1-2 mg daily	4 mg daily			
ARB (If unable to tolerate ACEI)						
Candesartan	HFrEF: Improve LVEF and treat hypertension HFpEF: treat hypertension	4-8 mg daily	32 mg daily	Titrate every 4 weeks (increase dose 50-100%).	BP, electrolytes and creatinine 7-14 days after medication is initiated and with each dose adjustment.	
Irbesartan		75 mg daily	300 mg daily			
Losartan		50 mg daily	150 mg daily			
Valsartan		40 mg BID	160 mg BID			
Beta Blocker						
Carvedilol	HFrEF: Improve LVEF and regulate heart rate HFpEF: reduce BP and regulate heart rate	3.125 mg BID	25 mg BID; 50 mg BID (>85kg)	titrate 2-4 weeks (increase dose 50-100%).	HR and BP	Tolerated by majority of patients with COPD. Patients with reactive airways disease (RAD) may develop increased bronchospasm with BB and in these patients you may wish to use the highly B1 selective Bisoprolol and you may need to use a lower dose. Ivabradine does not cause bronchospasm and can be used in patients

						with sinus rhythm who cannot take BB.
Bisoprolol	HFrEF: Improve LVEF and regulate heart rate HFpEF: reduce BP and regulate heart rate	1.25 mg daily	10 mg daily	titrate 2-4 weeks (increase dose 50-100%).	HR and BP	Indicated for prevention of HF, not yet indicated for treatment of HF Reduce diuretic by 30% when initiating Also must reduce insulin and SU
Metoprolol	Long acting metoprolol succinate is not available in Canada. Short acting metoprolol tartrate is not indicated for HFrEF	12.5 - 25 mg daily	200 mg daily			
Mineralocorticoid Receptor Antagonists (MRA)						
Spironolactone	HFrEF: improve LVEF; HFpEF:Assist in volume regulation and antifibrotic.	12.5 mg daily	50 mg daily	2 weeks	Monitor electrolytes and creatinine 3-7 days after medication is initiated and with each dose adjustment	More risk of hyperkalemia, less of hypotension. May precipitate hyponatremia HFpEF: Consider if increased NT-pro-BNP.
Eplerenone		25 mg daily	50 mg daily			
Eplerenone restrictions: Only use eplerenone for: 1. Patients on eplerenone prior to admission; **or** 2. Patients with New York Heart Association (NYHA) Class II chronic heart failure (HF) with left ventricular systolic dysfunction (LVSD) with ejection fraction (EF) equal to or less than 35% and who are intolerant to spironolactone (e.g., gynecomastia, loss of libido, menstrual irregularities)						
Sodium-glucose Cotransporter-2 Inhibitor (SGLT2i) *empagliflozin and canagliflozin are not currently on AHS formulary for this indication						
dapagliflozin	HFrEF & HFpEF	10 mg Daily	10 mg Daily	XXX	XXX	XXX
empagliflozin		10 mg Daily	10 to 25 mg Daily	XXX	XXX	XXX
canagliflozin		100 mg Daily	100 to 300 mg Daily	XXX	XXX	XXX
Evidence based medications for HFREF (LVEF less than 40)						
Sinus Node Inhibitor (SNI)						
Ivabradine	HFrEF: improve LVEFand regulate HR (to be used	2.5-5mg BID	7.5mg BID	2 weeks	HR only, may need ECG if suspicious of AF;	Must be initiated by IM/CARD but can be continued or titrated without IM/CARD.

	only in patients in sinus rhythm).					Works only if patient is in sinus rhythm
Angiotensin receptor-neprilysin inhibitor (ARNI)						
Sacubitril/ Valsartan	HFrEF: improve LVEF and treat hypertension	24/26 mg BID	97/103 mg BID	2-4 weeks	Monitor BP, electrolytes, creatinine 7-14 days after medication is initiated and with each dose adjustment	indicated if not optimally managed with ACEI or ARB or depending on NT-pro-BNP/documented LVEF; **Cannot use with ACEI or ARB, must have 36 hour washout;** Must be initiated by IM or CARD but can be titrated without IM/CARD;
Symptom based therapies						
Hydralazine	HFrEF and HFpEF: reduce symptoms of angina and/or orthopnea	10-37.5 mg TID	75-100 TID to QID	XXX	XXX	XXX
Nitrates	HFrEF: reduce symptoms of angina and/or orthopnea. HFpEF: reduce symptoms of angina and/or orthopnea.	0.2 mcg/hr topical patch or sustained release 30 mg od	No Limit	XXX	BP only	Must have nitrate free period to avoid tachyphylaxis- minimum 8 hours daily
		Isosorbide dinitrate 10-20 mg TID (Isosorbide mononitrate 30 to 120 mg Daily may be ordered as a long acting formulation)	40 mg TID	XXX		
Digoxin	HFrEF: For HR control if not optimally managed with other medications. Only for use in patients with systolic HF. HFpEF: For HR control if not optimally managed with other medications	0.0625 od to 0.125 mg od		No need to titrate	HR, electrolytes, creatinine and serum digoxin level 5-7 days after initiation and with dose adjustments.	Ensure at least 8 hours after last dose for TROUGH level. Do not titrate- only need to be certain level is < 1.2 nmol/L

NOTE: If patient has a dehydrating illness (eg. Gastro/flu) consider holding MRA/Diuretic and possibly ACEI/ARB/ARNI until illness resolves.

Guide for titration of medications, general comments:

1. **Assess HR (particularly with beta-blocker/sinus node inhibitor)**
   a) Controlled HR is needed for optimal management.
   b) HR should be ideally 50-70 bpm for sinus
   c) HR should be 90-100bpm for atrial fibrillation.
   d) If HR is greater than 100, reassess medications- consider increase in dosage or call to Specialist Link for discussion.
   e) If resting HR is less than 50, consider call to specialist LINK for discussion.
2. **Assess for fatigue and its impact on function (particularly with beta-blocker)**
3. **Assess BP**
   a) The recommendation is to treat to current hypertension guidelines. Systolic BP less than 130 is ideal.
   b) Be extremely careful when using multiple diuretics, because this will greatly increase the risk of hypotension (rapid diuresis) and hyponatremia.
   c) If systolic BP <90 mmHg with symptoms, a review of medications and potential medication adjustment based on patient's fluid status may be required. Consider call to Specialist Link for advice.
4. **Assess for postural lightheadedness**
   Monitor for symptoms of orthostasis and assess patient for orthostatic hypotension. Symptoms for orthostasis may be most common in the morning when the patient is waking up.
5. **Check electrolytes (Particularly with diuretics, ACEI/ARB/ARNI/MRA)**
   a) If potassium 5.2-5.5mM-stop potassium supplements and reduce/hold MRA (if applicable). Reassess Potassium in 3-5 days.
   b) If potassium 5.6-6.0-stop potassium supplements, MRA and hold ACEI/ARB. Reassess potassium in 2-3 days and assess ACE/ARB dose accordingly.
   c) If potassium >6.0-send to ER (call RAAPID) for treatment of hyperkalemia.
6. **Check creatinine (Particularly with diuretics, ACEI/ARB/ARNI/MRA)**
   a) The more rapidly the creatinine changes, the more frequent reassessment is required. Changes of > 20%-30% increase in creatinine should necessitate a review of medications and potential medication adjustment based on patient's fluid status. Consider call to Specialist Link for advice.
   b) A common cause of increased creatinine is hypovolemia. A volume assessment of the patient is warranted and reduction/temporary cessation of diuretics is the first step.
   c) Proactively reduce use of diuretics during concomitant episodes of dehydrating illnesses/periods of poor intake.
   d) Most clinicians will stop the MRA and reassess before stopping the ACEI (or ARB) if the creatinine level is increasing.

Patients seen in follow up after hospitalization should have had creatinine and electrolytes ordered at the time of discharge to be reviewed in office visit 7-10 days post-hospitalization. Once stable, it may be worthwhile following up with the patient and monitoring labs once a month for 3 months and then every 3 months thereafter. In many HF clinics, serum electrolytes, creatinine/GFR and BUN are routinely measured every 1-3 months in stable patients. Creatinine, electrolytes, and BUN should also be checked within first few days of any intercurrent illness that may affect volume or renal status (e.g., Gastroenteritis, influenza or recent surgery).

5. COMORBIDITY MANAGEMENT

Comorbidities should be identified and treatment optimized when possible. Conditions that may contribute to/or are associated with heart failure include:

1) Diabetes-treatment should be optimized according to current diabetes guidelines. Use of sodium-glucose transporter 2 (SGLT2) inhibitors in this group may be beneficial. Starting dose of these medications in patients with HF is as per the product monograph. These medications are indicated for prevention of HF, but not yet indicated for the treatment of HF. If the patient is taking a loop diuretic, it is recommended to reduce diuretic by 30% when initiating SGLT2 inhibitors. Also, it is recommended to reduce the dose of insulin by 10-20% but depends on BS control- if HBAic is > 8 you can probably just start it if no recent hypoglycemia.
2) Sleep apnea-should be considered in patients with risk factors and treatment initiated (sleep apnea pathway).
3) COPD is a common co-morbidity and management should be optimized (see COPD pathway).
4) Gout-avoid use of NSAIDs or steroids as both are known to affect BP and renal function (see Specialist Link for gout pathway). Colchicine is preferred for management of a gouty episode.
5) Heart failure is not a stand-alone indication for oral anticoagulants- the usual indications for this class of medications applies. Novel anticoagulants are safer that warfarin in patients with HF and just as efficacious and so preferred over warfarin

6. Self management, lifestyle modifications

Table 2: Self-management and lifestyle modifications

	Recommendations	Local resources
Weight monitoring	Daily monitoring. If weight increases more than 2kg in 2 days or more then 2.5kg in 7 days, should seek medical attention	Heartandstroke.ca (Pages 7-9)
Salt intake	Goal is to limit daily intake to 2000mg sodium/day	Alberta Healthy Living Program (AHLP) Heartandstroke.ca (Pages 11-12) PCN resources- dietitian 1:1
Fluid intake	Goal is 1.5-2L per day	AHLP www.heartandstroke.ca (pages 13-14) PCN resources
Exercise	Goal is starting at 10 minutes, increasing to 30 minutes 2-3X/week	AHLP www.heartandstroke.ca (pages 19-23) Cardiac rehab
Smoking	Smoking cessation advised	Albertaquits.ca AHLP PCN resources
Alcohol	Abstinence is recommended if HF is felt to be secondary to alcohol use disorder. Otherwise, a safe amount of alcohol consumption in HF is not known; therefore, the recommendation is as little as possible.	AHS resources -Access Mental Health -Addiction helpline -Adult addiction services -Community resources
Obesity counselling	Weight management recommended if obesity present as even 5-10lbs weight loss can impact symptoms and signs	AHLP Community resources PCN resources
Immunization*	Annual flu vaccine Periodic pneumococcal pneumonia immunization (as per product monograph) *Immunizations have been shown to reduce mortality and hospitalization by 20% in elderly patients with HF	PCN pharmacists, AHS and community resources
Mood and stress management	Discuss with health care providers May be more common in patients with HF and may impact sense of well being	Heartandstroke.ca (pages 54-61) PCN, AHS and community resources

Advance Care Planning	Encourage patients to choose an agent, communicate their values and document these in a Personal Directive	www.conversationsmatter.ca

- **Secondary Medications to relieve symptoms in HFrEF or HFpEF:**
  - **Digoxin:** Not a first line medication in treating HF. May be used for patients in sinus rhythm who continue to have moderate to severe symptoms of HF despite target dose of beta-blockers and SNI (HFrEF). Alternatively, may be used for patients in atrial fibrillation who are not rate controlled (ie. HR greater than 100) despite target dose of beta-blockers. May also be used in patients for whom beta-blockers are contraindicated. See Table 1 for dosing and instructions.
  - **Nitrates:** May be used to reduce symptoms of angina and/or orthopnea. See Table 1 for dosing and instructions.
  - **Hydralazine/Nitrate combination:** These medications, given together, are reserved for patients who unable to tolerate ACEI or ARB due to angioedema, or have severe renal dysfunction/hyperkalemia; or have persistent/severe symptoms despite optimal medical management. The major limitation of these medications is hypotension and they are therefore infrequently used.

7. FOLLOW UP: WHEN, WHO AND HOW TO REFER

When to refer: As the clinical course of HF progresses co-management with specialty (internal medicine or cardiology) is warranted. In particular, co-management with the Heart Failure clinics (also referred to as cardiac function clinic) can improve symptoms, quality of life, and outcomes. *Please note that HF clinics in Calgary operate under supervision of an Attending Cardiologist, so there will need to be a Cardiologist who will follow the patient while in the Clinic.* The following are indications for referral:

- New onset HF, particularly if difficult to diagnose or uncertainty in diagnosis (especially with multiple comorbidities)
- HF following recent MI
- Two or more hospitalizations for decompensated heart failure in the past year
- HF with persistent, advanced symptoms/not responding to treatment
- HF with persistent HR <50 or >100, systolic BP <90 with symptoms, chest pain, symptoms or severe renal disease (GFR ≤ 30).
- Moderate or severe valvular heart disease for discussion of surgery/optimized medical management.
- Patients with HF and syncope
- Patients with LVEF less than 40 for periodic update for evidence-based medical management and decisions about device management (including implantable cardioverter defibrillator (ICD) or cardiac resynchronization therapy (CRT)).

Who to refer to (Specialty):

Possible referrals for patients with HF include:

- Cardiac Navigation
- Cardiology
- HF Clinic
- General Internal Medicine

Alberta Referral Directory may be helpful in assisting with referral criteria.

BACKGROUND

About this pathway

- This pathway was initially co-developed in 2019 by primary care physicians and cardiologists. The content within the pathway is intended for adults that live within Calgary Zone. The pathway was updated in 2023 with support from the Cardiovascular Health and Stroke SCN to reflect the changing guidelines for heart failure management by the Canadian Cardiovascular Society https://onlinecjc.ca/article/S0828-282X(19)31514-4/fulltext

Authors and conflict of interest declaration

- Names of participating reviewers and their conflict of interest declarations are available on request.

Pathway review process, timelines

- Primary care pathways undergo scheduled review every three years, or earlier if there is a clinically significant change in knowledge or practice. The next scheduled review is Sept 2026. However, we welcome feedback at any time. Please email comments to specialistlink@calgaryareapcns.ca

Copyright information

DISCLAIMER

This pathway represents evidence-based best practice but does not override the individual responsibility of health care professionals to make decisions appropriate to their patients using their own clinical judgment given their patients' specific clinical conditions, in consultation with patients/alternate decision makers. The pathway is not a substitute for clinical judgment or advice of a qualified health care professional. It is expected that all users will seek advice of other appropriately qualified and regulated health care providers with any issues transcending their specific knowledge, scope of regulated practice or professional competence.

PROVIDER RESOURCES

Community resources

Alberta Healthy Living Program

For: patients with a chronic condition, or at risk of developing a chronic disease and a primary care provider or nurse practitioner that are able to attend sessions either in person or virtually.
Alberta Healthy Living Program | Alberta Health Services

Services offered:
Education: health professionals or volunteers teach disease specific & general interest classes. Offered in English, Cantonese, Mandarin, Punjabi, and Tagalog
Nutrition Services: RD's facilitate various classes. Individual appointments available in Cantonese, Hindi, and Punjabi
Better Choices, Better Health: 6 wk self-management workshop to live successful, healthier lives. Offered in English, Cantonese, and Punjabi
Group Exercise: Supervised group exercise monitored by health professionals.

Referral by: health care providers (any) or patient self-referrals

Cardiac Rehabilitation

For: Those recovering from a heart event, heart surgery, or living with a heart condition (HF)
Referral by family physician or specialty

Referral information: Referral must come from family physician, nurse practitioner, cardiologist, or other physician. Must be a cardiologist for the medically-supervised program.
Referring Physicians + Clinics - TotalCardiology Rehab

Services Offered:
Total Cardiology:
-12 week exercise, education and health-coaching program
-Medically-supervised exercise program
-Risk reduction and screening
-Exercise stress test
*A fee for patient's may be required. This may be covered by personal extended health care coverage. Payment plans and financial assistance are available.
Patient information: https://tcrehab.totalcardiology.ca/info-for-patients/

Cardiac function clinics (CFC)

For: Patient with a designated cardiologist with a diagnosis of symptomatic HF, documented measured of LVEF and requires ongoing titration of medication or surveillance (>3 visits). Patients must be at least 18 years of age and physically attend appointments. Exceptions can be discussed between cardiology and medical director of CFC

Services Offered: Multidisciplinary clinic dedicated to support HF patients that have complex care needs, requiring close monitoring and/or medication optimization. Physical assessments, management or medical and non-pharmacologic treatment, patient teaching

Referrals from: Physicians or Nurse Practitioners. Must complete Referral form, attach discharge summary/consultation note, attach relevant tests, attach patient contact information, include most recent LVEF and BNP within last six months

Community paramedics

For: Adults with known HF requiring short term intervention(s).

Services offered: Short-term crisis intervention. Mobile minor emergency service/clinic. Can provide treatments, draw labs, perform ECGs. Care needs to be provided in collaboration with primary care or specialty physician.

Referrals from: multiple providers in the form of telephone call or completion of community paramedic patient referral form.

Home care Heart Failure Team

For: Patients 65 years or older and admitted to hospital in the last 12 months with a confirmed diagnosis of HF who would benefit from focused case management by the HF team and are willing and able to make lifestyle changes.

Services offered: clients with advanced HF for symptom management, end of life care, ED avoidance, assistance with aids to daily living and to improve quality of life

Referrals from: currently must be referred through General Home Care Program and then will be assessed for HF specialty team
Palliative Care
Palliative Care referral early in disease course can help with illness understanding and coping, symptom and function concerns, advance care planning and care coordination in the setting of advanced HF (recognizing prognostic uncertainty is common use patient needs and symptoms not responding to management as a guide of when to refer). Later referrals can assist with end-of-life care at home/facility and hospice access. Access pathway and telephone advice at Specialist.Link.ca

Provider Resources	
2021 CCS/CHFS Heart Failure Guidelines Update: Defining a New Phrmacologic Standard of Care for Heart Failure With Reduced Ejection Fraction	https://www.onlinecjc.ca/article/S0828-282X(21)00055-6/fulltext
2017 ACC Expert Consensus Decision Pathway on Optimization of Heart Failure Treatment: Answers to 10 Pivotal Issues about Heart Failure with Reduced Ejection Fraction	https://www.sciencedirect.com/science/article/pii/S0828282X1730973X?via%3Dihub
2021 The Canadian Cardiovascular Society: Is it heart failure and what should I do?	https://ccs.ca/app/uploads/2021/05/2021-HF-Gui-PG-EN-2.pdf
The CCS Heart Failure Companion: Simplified Treatment Algorithm for HFrEF	https://ccs.ca/app/uploads/2022/04/CCS_HF_Info_EN_v3.pdf
Advanced care planning	https://www.albertahealthservices.ca/info/Page9099.aspx

PATIENT RESOURCES

Heart and Stroke: Living with heart failure: Resources to help manage your heart failure	https://www.heartandstroke.ca/-/media/pdf-files/canada/health-information-catalogue/en-living-with-heart-failure.ashx?la=en&hash=84BE0AF1FA336336A78EA963B65C4F19E53CD1D0
Canadian heart failure society: Patient resources	https://heartfailure.ca/patient-resources/patient-resources
My Health Alberta	https://myhealth.alberta.ca/Alberta/Pages/heart-failure-action-plan.aspx
Medline Plus: Heart Failure	https://medlineplus.gov/languages/heartfailure.html
Advanced care planning	www.conversationsmatter.ca