

Heart Failure, Management of (in Acute Care)

Site Applicability

All VCH & PHC acute care sites.

Exception: This guideline is not intended for critical care areas.

Target population: All patients admitted to hospital with Heart Failure (HF) as the primary or secondary diagnosis and all patients who develop HF while in hospital.

Practice Level

Basic skills for the following professions (where the term “all disciplines” is used within this document, it is understood that interventions will be within respective scopes of practice):

- NP, RN, RPN, LPN
- RD (Dietitian)
- RT
- OT
- PT
- Pharmacist

Need to Know

For a general review of Heart Failure, please review **Heart Failure: Management and Support** on the [LearningHub](#).

Please note:

- Site specific HF pre-printed orders have been implemented across all VCH and PHC acute care sites. Physicians are encouraged to use these orders on admission or consultation of HF patients. The orders represent the most current HF guidelines as recommended by the [Canadian Cardiovascular Society](#).
- A Heart Failure Pathway (VCH.0125) is also available to guide care (see [Appendix A](#)).

Types of Heart Failure

Heart failure is a complex syndrome of abnormal heart function which leads to signs and symptoms of poor cardiac output, volume overload or both (Arnold, JMO et. al. 2006). Heart Failure is the inability of the ventricle(s) to pump blood to sufficiently meet the oxygenation and nutritional needs of the body with a resultant increase in the total body fluid volume.

Heart failure can either be:

- **Systolic:** Systolic heart failure, also known as HF with reduced ejection fraction (REF), results in the inability of the heart to effectively eject blood. In these patients the ejection fraction (EF) is less than or equal to 40%. The EF is the amount of blood ejected from the ventricle with each beat. A normal EF is approximately 60%.
- **Diastolic:** Diastolic heart failure is also known as HF with preserved systolic function (PSF) or preserved ejection fraction (PEF). Diastolic HF is the inability of the heart to relax properly; hence it does not fill completely. Patients generally have a normal ejection fraction, but the volume of blood ejected with each beat is considerably less due to the small size of the ventricle. Diastolic heart failure is often caused by hypertension, causing the muscle to become overdeveloped and stiff.

Heart failure is also defined according to the location or the part of the heart which is most affected:

- **Left ventricular heart failure:** inability of the left ventricle to pump an adequate volume of blood into the systemic circulation, which causes blood to back up into the lungs and causes poor forward flow to the body.
- **Right ventricular heart failure:** inability of the right ventricle to pump an adequate volume of blood into the pulmonary vessels which causes blood to back up in the venous system and causes poor forward flow to the lungs. Right ventricular HF is most commonly a result of long-standing left ventricular HF.
- **Bi-ventricular heart failure:** both ventricles are affected. This most commonly results from long-standing left ventricular HF which in turn affects the function of the right side of the heart. Bi-ventricular HF can also result from a range of cardiomyopathies (heart muscle diseases) e.g. myocarditis or alcohol causing both ventricles to fail simultaneously.

Heart failure can have phases of stability or exacerbation.

- **Chronic heart failure** is a long-term condition in which the patient has periods of stability, however over time, the heart progressively loses its pumping ability. The body tries to compensate for the low cardiac output which characterizes heart failure by retaining salt and fluid and initiating vasoconstriction. While this is helpful in the beginning, eventually the body decompensates. Figure 1 depicts the HF trajectory most often seen, starting with initial diagnosis (1), long periods of stability (2) which are typical early in the disease process and as HF progresses, periodic exacerbations (3) with slow deterioration (4) are seen with eventual progression to the end of life phase (5).

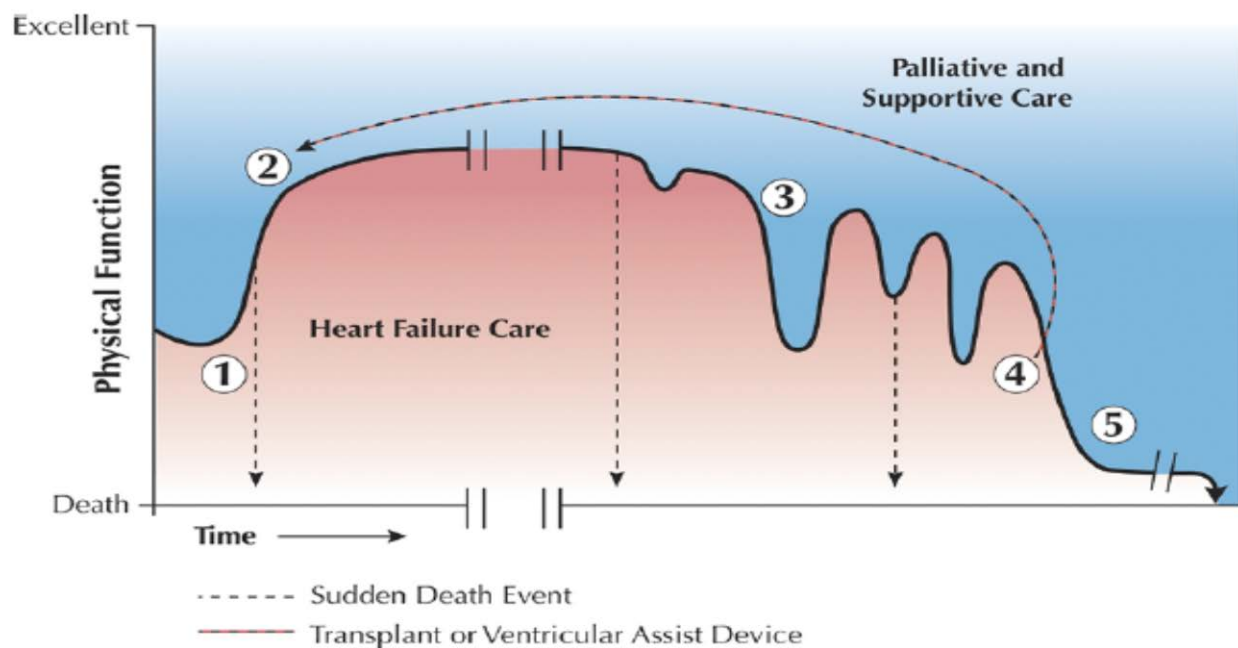


Figure 1 - Taken from Goodlin, 2009

- **Acute decompensated heart failure** represents an exacerbation in symptoms and pathology. This is a critical condition often seen in patients with chronic heart failure in which circumstances (such as infection, failure to take medication as ordered, renal failure, fluid retention) cause the heart's pumping action to suddenly worsen because the body cannot compensate for the change; this may result in symptomatic hypotension, pulmonary edema, signs and symptoms of shock. Common precipitating factors or triggers for decompensation can be found in [Appendix B](#). Understanding what triggered the decompensation is important as this will direct education around self-management skills as well as the types of therapy delivered.

Causes of Heart Failure

The two main causes of heart failure are **coronary artery disease** (CAD) and **chronic hypertension**.

Other common causes include:

- Valvular heart disease
- Severe pulmonary disease
- Congenital heart disease
- Arrhythmias

Signs and Symptoms of Heart Failure

Signs and symptoms are more often described in terms of the ventricle affected. Right-sided HF typically produces signs and symptoms consistent with venous congestion. Left-sided HF causes signs and symptoms associated with poor forward flow and in the setting of fluid overload can result in a back-up of fluid to the pulmonary system. Table 1 outlines signs and symptoms of right and left-sided HF.

LEFT-SIDED		RIGHT-SIDED	
Sign	Symptom	Sign	Symptom
<ul style="list-style-type: none"> • Cheyne-Stokes respirations • Increased HR and decreased BP • Decreased PaO₂, slight increase PaCO₂ (poor O₂ exchange) • Crackles (pulmonary edema) • Extra heart sounds (S3 and S4) • Weight gain 	<ul style="list-style-type: none"> • Fatigue • Dyspnea • Orthopnea • Cough • Nocturia • Paroxysmal nocturnal dyspnea • Activity intolerance 	<ul style="list-style-type: none"> • Peripheral edema • Weight gain • Increase HR and decreased BP • Edema of dependant body parts • Ascites • Anasarca (massive generalized body edema) • Jugular venous distension • Hepatomegaly • Right-sided plural effusion 	<ul style="list-style-type: none"> • Fatigue • Right upper quadrant pain • Anorexia • Abdominal bloating • Nausea • Dyspnea • Orthopnea • Activity intolerance

Table 1

House-Fancher, M.A., Foell H. Y. (2010). *Nursing management: Heart failure*. In L. Lewis, M. Heitkemper, S. Dirksen, L. Bucher & P. O'Brien (Eds). *Medical-surgical nursing in Canada: Assessment and management of clinical problems* (pp.883-903). Toronto: Elsevier

Equipment & Supplies

- Blood pressure measuring equipment
- Scale
- Pulse oximeter
- Stethoscope
- Printed health education material (HF Package [FD.780.H432](#))
- Pre-printed orders and associated chart documents (Fluid sheet, teaching record, discharge tool)

Practice Guideline

Assessment, Interventions and Considerations

Within the context of acute care, patients with heart failure require on-going assessment and management conducted by all disciplines within their respective scopes of practice. Physical assessment of the HF patient focuses on observing effectiveness of therapies and assessing for signs and symptoms of decompensated HF. **New abnormal findings or worsening of symptoms should be documented and reported to the MD/NP.** Assessment includes the following:

Cardiovascular			
Assessment	Abnormal Findings	Intervention	Clinical Considerations
Blood Pressure	Hypotension, altered mental status	Symptomatic Hypotension: Routine intervention Maintain patent airway, monitor and treat hypoxia/hypoxemia as per protocol, establish IV access, lower the head of the bed MD or NP should be notified for symptomatic hypotension. Initial response may be to decrease HF medications or alternatively to ensure patients have not had too vigorous a diuresis resulting in volume depletion.	MD/NP may want to rule out alternate cause of hypotension Asymptomatic hypotension may be expected in HF patients. Many HF patients will have SBP less than or equal to 80 mmHg at baseline Determine if hypotension is causing signs and symptoms (e.g. dizziness, lightheadedness, anxiety, confusion, nausea, pallor, diaphoresis, tachycardia, chest pain) Hypotension can be expected when new HF medications are started or if there is an increase in the dose It is not recommended to stop ACE inhibitors and beta blockers abruptly. It is expected that these medications will lower HR and BP and may be adjusted by the MD/NP if the patient becomes symptomatic Hold medications based on vital sign parameters set by MD/NP See Appendix C for medications commonly used in HF See Appendix D for medications to avoid in HF
	Postural Hypotension	Educate patient re: care with sudden position changes Patient is at risk for falls. Ensure bed in lowest	Postural hypotension is a common finding in HF patients, particularly the frail elderly A postural drop in blood pressure

Note: This is a **controlled** document for VCH & PHC internal use. Any documents appearing in paper form should always be checked against the electronic version prior to use. The electronic version is always the current version.

		position, call bell in reach, and assist as needed with mobilization. Consider consulting PT to instruct patient on use of walker for rising.	of 20 mmHg or more or if patient is symptomatic with position change should be reported to MD/NP
	Hypertension	Report if BP falls outside of MD/NP parameters	Hypertension increases the workload of the heart and is a major cause of diastolic heart failure. Tight control of the BP is paramount to improving outcomes in this patient population.
Heart rate/rhythm/palpitations	HR less than 50 beats per minute (BPM) (bradycardia)	Assess for signs and symptoms of low cardiac output. Check predefined parameters for HR to determine whether or not to hold beta blocker and/or digoxin. If unsure, check with MD/NP	Signs and symptoms of low cardiac output may include hypotension, dizziness, lightheadedness, nausea, chest pain, diaphoresis
	HR greater than 100 BPM (tachycardia)	Assess for signs and symptoms of low cardiac output Assess temperature to determine if febrile Prepare for administration of fluid if hypovolemia is suspected by MD/NP Treat pain if present (avoid NSAID's) If this is a new finding, patient may require ECG to confirm rhythm and to determine whether there is new atrial fibrillation or a concerning ventricular arrhythmia	Signs and symptoms of low cardiac output related to tachycardia include palpitations, hypotension, dizziness, lightheadedness, nausea, chest pain Atrial fibrillation is present in up to 25% of HF patients. Ventricular arrhythmias are a major cause of death in HF patients with LVEF less than 30%
	Irregular pulse	Assess for signs and symptoms of low cardiac output Assess apical pulse Consult MD/NP re: need for ECG and antiarrhythmic therapy	Patients with documented atrial fibrillation or atrial flutter should be assessed as to the need for anticoagulation Consult MD/NP about changes to activity level
Fluid volume status	Increasing daily weight 2 kg (4 lbs) in 2 days 2.5 kg (5 lbs) in a week OR	Weigh patient on admission and every morning before breakfast with an empty bladder - record in chart Administer diuretic as ordered	To minimize inaccuracy a standardized weighing protocol should be used to assess patients' body weight daily. The key components of a standardized weighing protocol are consistency for the following

Note: This is a **controlled** document for VCH & PHC internal use. Any documents appearing in paper form should always be checked against the electronic version prior to use. The electronic version is always the current version.

	As identified by MD/NP on an individual basis	<p>Document intake on fluid record: document output, if ordered</p> <p>2 gram Sodium diet, or as per Prescriber's Order</p> <p>Fluid restriction 1.5 litres per day or per Prescribers Orders (consider volume of fluid provided with medications)</p> <p>Consider ways to concentrate IV fluids if needed. Consult MD/NP if order required to have medications mixed in minimum volume by pharmacy.</p> <p>Educate patient and/or caregivers on the purpose and need for a fluid and sodium restricted diet</p> <p>Consult Dietitian</p> <p>Use a fluid restriction record:</p> <ul style="list-style-type: none"> • VCH: My Daily Fluid Restriction Worksheet (VCH.0128) • PHC: 24 Hour Fluid Restriction Worksheet (PHC-HH093) 	<p>elements:</p> <ul style="list-style-type: none"> • Type of Scale: patients should be weighed on the same type of scale (e.g., chair versus bed) • Zeroing: ensure the scale is calibrated to zero prior to each weight. Non-ambulatory patients can be lifted off the bed with a mechanical device • Time of Day: patients should be weighed at the same time of day (e.g., before or after breakfast) • Clothing: patients should be weighed in their hospital gown for the most accurate body weight to avoid weighing errors due to additional items (e.g., shoes, sweater, blanket). If a patient is incontinent, staff should provide incontinence care prior to weighing <p>Compare each day's value to the previous day and monitor trends</p> <p>Notify MD/NP of upward or downward trends</p>
	Pitting edema	<p>Note the location, amount, and character. In considering location, determine if the edema is localized (e.g. ankles) or generalized (involving all of the body – anasarca), unilateral or bilateral (both ankles in a patient with HF)</p>	<p>(See Appendix E for edema scale)</p> <p>Avoid keeping limbs in gravity dependant positions</p> <p>Apply compression stockings as ordered</p> <p>Encourage ROM exercise of the lower limbs. Consider consulting PT</p>
Urine Output	Less than 30 mL/hr or less than 400 mL/24 hours	<p>Monitor and document urine output if ordered by MD/NP</p>	<p>Urine output is generally only closely monitored if the patient is recently admitted or unstable. In stable patients intake and weight are monitored and documented</p> <p>Excessive urine output (greater than 2.5 to 3 L/day) should be reported to MD/NP</p>

Note: This is a **controlled** document for VCH & PHC internal use. Any documents appearing in paper form should always be checked against the electronic version prior to use. The electronic version is always the current version.

Activity Level	Increasing fatigue, activity intolerance and weakness	Promote bed rest until patient is stabilized Patient is at risk for falls. Ensure bed in lowest position, call bell in reach, and assist as needed with mobilization. Consider consulting PT to instruct patient on use of walker for rising.	See Appendix F for The NYHA Classification of HF. This tool classifies HF based on how much patients are limited during physical activity. This is then used to guide treatment decisions Educate patient on the need to balance activity with rest periods Consult OT/PT For more information see Falls Guideline: VCH: D-00-07-30033 PHC: IDG1052
----------------	---	---	--

Respiratory			
Assessment	Abnormal Finding	Intervention	Clinical Considerations
Oxygenation status	SaO ₂ less than 90%	Provide supplemental oxygen to maintain SpO ₂ greater than or equal to 90% or as per institutional policy: PHC: Oxygen Therapy, Acute Care Protocol VCH: - VA: Oxygen Therapy - Coastal: Oxygen Administration Position patient for maximal lung expansion	Oxygen should be used cautiously in patients with normal oxygen concentrations due to concerns with increasing systemic vascular resistance and reducing cardiac output BiPAP or CPAP should be considered for patients with a high RR and systemic hypoxemia despite high flow oxygen administration. Specific sites may require that patients be monitored in a critical care or emergency setting
Skin colour	Cyanosis, palor		
Respiratory rate	Tachypnea		
Chest sounds	General bilateral crackles with or without wheezing Does not clear with coughing	Encourage deep breathing and coughing in consultation with RT, PT Administer routine and PRN diuretics as ordered Consult PT for input on managing dyspnea i.e., breathing control exercises and rest positioning Consider notifying RT if available especially if patient has co-morbidities that may be exacerbating HF symptoms and vice versa (e.g. COPD)	Often, dyspnea is related to increased fluid volume status. See above section on Fluid Volume Status Assessment. MD/NP may order chest x-ray, arterial blood gases (ABG's)
Presence of a cough	Initially dry and nonproductive. Can advance to wet cough productive of pink or blood tinged frothy sputum		
Dyspnea	Orthopnea (SOB while laying flat). Paroxysmal nocturnal dyspnea (waking at night with SOB), SOB OE		

Note: This is a **controlled** document for VCH & PHC internal use. Any documents appearing in paper form should always be checked against the electronic version prior to use. The electronic version is always the current version.

Smoking status	Current smoker or used tobacco within past 7 days? Used tobacco within the past 6 months?	Nicotine replacement therapy as per institutional policy: Tobacco Dependence Management Guideline [VCH-PHC] (<i>in process</i>) Patient may need NRT if used tobacco in past 6 months	Monitor and titrate NRT to sufficient nicotine levels. May need to decrease caffeine intake. Clearance and bioavailability of some medication may be affected by interaction with cigarette smoking. Medications may require a change in dosage for smokers and again when they quit smoking
----------------	--	---	--

Gastrointestinal			
Assessment	Abnormal Finding	Intervention	Clinical Considerations
Changes in appetite	Reduced appetite	Administer antiemetic as ordered	Consider dietitian referral for patients with weight loss malnutrition Some anti-emetics may have unwarranted cardiac side effects including arrhythmias
	Nausea/vomiting	Encourage small, frequent meals Consult Dietitian	
Abdominal pain	Pain, particularly in the right upper quadrant or epigastric area		Liver congestion (hepatomegaly) is a common finding and may contribute to abdominal swelling and/or pain

Self-Management Skills

HF is a chronic disease which cannot be cured, yet it can be managed with medications and self-management skills. The Heart Failure Teaching Record ([VCH.0124](#)) or (PHC-HH109) should be used to facilitate patient education. All patients should have their level of knowledge regarding self management skills assessed and then appropriate teaching should be completed.

The Teach Back method should be used to assess the patient and/or caregivers understanding of discharge instructions and the ability to perform self care. The method involves asking the patient or caregiver in a non-shaming way to restate in their own words what they thought they heard during the education session. A sample question would be “I want to make sure I explained this clearly. Can you please explain back to me which symptoms you will need to report to your doctor?” If a gap in understanding is noted, provide additional teaching followed by another request for Teach Back.

To support learning, provide patient with handouts which are available for each topic. The handouts listed in the table can also be obtained as a package: Heart Failure – Inpatient Education Package ([FD.780.H432](#)). All materials are accessed from Patient Health Education Materials Resource Catalogue ([VCH](#) or [PHC](#)).

Self Management Skill	Recommendation	Skills and Knowledge	Handout
Fluid restriction – to minimize fluid retention	1.5 to 2 L per day or 6 to 8 cups Some patients may require a more strict restriction	Understanding what counts as a fluid	Limiting Your Fluid Intake FD.786.M65
Sodium restriction – to minimize fluid retention	Less than 2 g per day	Understand sources of sodium Understanding how to read a nutrition facts panel for sodium content	Low Salt (Sodium) Diet BB.227.L69
Daily weight (where feasible) to monitor rapid gains or losses of fluid	To accurately perform weights at home patients should be encouraged to: Ensure scale is balanced and on a hard surface (not carpet), weigh at the same time of the day, e.g. first thing in the morning, before breakfast, after the first void and wearing similar weight clothes	A weight gain of 2 kg (4 lbs) in 2 days 2.5 kg (5 lbs) in a week needs to be reported to appropriate Health Care Provider (HCP)	Heart Failure Record BA.100.W44
Alcohol intake	Avoid excessive alcohol consumption as alcohol depresses heart function and may cause or worsen an irregular heart rhythm	If alcohol is not a problem, the patient may consume 1 (women) or up to 2 (men) standard drinks per day but remind the patient that this counts as part of their total daily fluid intake	
Smoking	Patients with HF should not smoke	Counsel current smokers regarding smoking cessation and advise all patients to avoid exposure to second-hand smoke.	Resources: BC Smoking Cessation Program (free nicotine patch or gum), QuitNow - www.quitnow.ca/ , the BC Lung Association , the Canadian Cancer Society or GP/NPs.
Recognition of signs of worsening HF and reporting changes in symptoms early to HCP Blood pressure and HR monitoring	Recognize symptoms of low blood pressure and symptoms of low or high HR	Aware of all signs and symptoms of HF How to measure BP and HR at home or at pharmacy	Resources for People with Heart Failure FD.780.R47
Adherence to prescribed medications Medication side effects	Patient to take all medications as prescribed Discuss side effects with HCP Do not stop or alter doses of medications without talking to HCP	Purpose of medications used in HF	Heart Failure Discharge Instructions FD.780.H43 Medication specific handouts

Note: This is a **controlled** document for VCH & PHC internal use. Any documents appearing in paper form should always be checked against the electronic version prior to use. The electronic version is always the current version.

Self Management Skill	Recommendation	Skills & Knowledge	Handout
Regular physical activity	<p>Regular physical activity is recommended for all patients with stable HF</p> <p>Patients will balance activity with rest</p> <p>Review appropriate activities and activities to avoid</p> <p>Review falls risk</p> <p>Promote energy conservation and prevention of edema with correct positioning</p> <p>Consider referral to community OT/PT</p>		<p>Why People with Heart Failure Should Keep 'Active'</p> <p>FD.780.W54</p>
Advance care planning/goals of care	<p>Regular discussion around goals of care should take place</p> <p>If implantable cardioverter defibrillator (ICD) in place, ensure patient is aware and regularly attends the ICD clinic</p>	<p>Patient and family should be aware of presence of ICD and the option of deactivation of the device when risks outweigh benefits. This can be done through the primary care provider and the ICD clinic</p>	<p>Provide Advance Care Planning brochure (00092207)</p>

Discharge and Transition Planning

- Ensure presenting symptoms have resolved and dry weight (weight at which patient is euvolemic) has been reached
- Ensure patient and/or caregiver is aware of worsening signs and symptoms of HF and what steps to take. Also ensure patient is aware of dietary restrictions (fluid and sodium) and need for daily weight
- Determine if scale is available at home
 - If no scale at home
 - encourage patient/caregiver to purchase one
 - identify friend/neighbor with a scale
 - community centre
 - GP office
 - Consider measurement of abdominal girth for those who can not stand on a scale
- Prior to discharge, discuss plan with attending physician
 - Referral to cardiac rehabilitation program encouraged for all able HF patients
 - If unable to attend cardiac rehabilitation program consider community team referral (PT/OT/nursing) for further follow-up re: education and exercise
 - Refer HF patients with weight loss or malnutrition to the community RD
 - Follow-up appointment within 2 weeks to Primary Care Provider
 - Follow-up appointment with specialist
 - Follow-up for laboratory and other testing
 - Consider community DNAR if patient had DNAR orders while in hospital
 - Ask about referral to local Heart Failure Clinic (newly diagnosed HF, recent HF admission, HF associated with other cardiac conditions or other co-morbid conditions, intolerance or poor compliance with treatment regimens)
 - St. Paul's Hospital
 - Vancouver General Hospital

- Communication to primary care providers at discharge to include
 - diagnosis
 - medications on discharge
 - recommended titration of HF medications
 - findings on discharge such as EF, BP, HR, weight, K+, Cr, INR
 This information should also be provided to the patient and/or caregiver.
- Transitioning to/collaborating with Palliative Care

Although advanced care planning is appropriate throughout the entire HF disease trajectory, referrals to palliative care services should be considered when a patient is deemed to have a prognosis of less than one year or advanced symptomatology. A patient with HF may experience many exacerbations followed by periods of wellness (see [Figure 1](#)). Indicators suggestive that the patients' health status is declining are:

 - increasing frequency of hospital admissions for HF
 - increasing fatigue
 - decreasing response to HF medication
 - nausea and poor appetite/early satiety
 - declining activity level

Expected Patient Outcomes

The patient will:

- have improved symptoms of HF
- receive and understand discharge instructions
- receive a prescription for all appropriate evidence based HF medications
- have follow-up by primary care provider within 2 weeks of discharge
- have specialist follow-up either through a HF clinic or specialist office within 4 weeks of discharge
- receive and understand essential heart failure self-management education and materials
- be linked with appropriate community resources and supports
- have had goals of care reviewed
- have reduced readmission and ED encounters

Documentation [order through [Printing Services](#) or PHC SCM]

See [Appendix G](#) for intended use of documents

Document	Site	Form number
Heart Failure Teaching Record	Vancouver Coastal Health (VCH) all sites	VCH.0124
	*Powell River	201-912
	Providence Health Care (PHC)	PHC-HH109
Fluid restriction worksheet	VCH: My Daily Fluid Restriction worksheet	VCH.0128
	PHC: 24 Hour Fluid Restriction worksheet	PHC-HH-093
Discharge Guidelines for Heart Failure Patients	PHC only	PHC-HH110
Heart Failure Discharge Prescription and Transition Tool	Lions Gate Hospital only	VCH.CO.0052
Heart Failure Pathway	VCH and PHC	VCH.0125
Heart Failure Order sets	VGH acute: Heart Failure Adjunct orders	VCH.VA.PPO.820
	PHC: Heart Failure Adjunct orders	PHC-PH494
	LGH: Heart Failure Admission orders	VCH.CO.LGH.0068
	Sechelt: Heart Failure Admission orders	MM 0954
	Power River: Heart Failure Admission orders	205-911

Note: This is a **controlled** document for VCH & PHC internal use. Any documents appearing in paper form should always be checked against the electronic version prior to use. The electronic version is always the current version.

	Squamish: Heart Failure orders	VCH.CO.SGH.0021
	Richmond: Heart Failure Adjunct orders	VCH.RD.RH.0287
Heart Failure, Management of in Community	VCH, Home and Community Care	D-00-07-30037
Heart Failure Zones	VCH, PHC	FD.780.H.431

References

- Arnold, J.M., Liu, P., Demers, C., Dorian, P., Giannetti, N., and Haddad, H. (2006). Canadian Cardiovascular Society consensus conference recommendations on heart failure 2006: Diagnosis and management. *Canadian Journal of Cardiology* 22(1), 23-45.
- Arnold, J.M., Howlett, J., Ducharme, A., Ezekowitz, J., Gardner, M., and Giannetti, N. (2008). Canadian Cardiovascular Society consensus conference guidelines on heart failure – 2008: Best practices for the transition of care of heart failure patients, and the recognition, investigation and treatment of cardiomyopathies. *Canadian Journal of Cardiology* 22(1), 23-45.
- Bichet, D.G. Diagnosis of polyuria and diabetes insipidus. In: Up-To-Date, Basow, DS (Ed), Up-To-Date, Waltham, MA, 2013.
- Brunner, L. S., Suddarth, D. S., & Smeltzer, S. C. O. (2008). Brunner & Suddarth's textbook of medical-surgical nursing (11th ed.). Philadelphia: Lippincott Williams & Wilkins.
- Goodlin, S. (2009). Palliative Care in Congestive Heart Failure. *J. Am. Coll. Cardiol.* 54; 386-396.
- House-Fancher, M.A., Foell H. Y. (2010). Nursing management: Heart failure. In L. Lewis, M. Heitkemper, S. Dirksen, L. Bucher & P. O'Brien (Eds). *Medical-surgical nursing in Canada: Assessment and management of clinical problems* (pp.883-903). Toronto: Elsevier.
- McKelvie, R.S., Moe, G.W., Ezekowitz J.A., Heckman, G.A., Costigan, J., and Ducharme, A. (2012). The 2012 Canadian Cardiovascular Society heart failure management guidelines update: Focus on acute and chronic heart failure. *Canadian Journal of Cardiology* 29(2013), 168-181.
- Nielsen GA, Rutherford P, Taylor J. How-to Guide: Creating an Ideal Transition Home. Cambridge, MA: Institute for Healthcare Improvement; 2009. Available at <http://www.ihl.org>.
- Ross, H. Howlett, J., Arnold, J.M., Liu, P., O'Neill, B.J., and Brophy, J.M. (2006). Treating the right patient at the right time: Access to heart failure care. *Canadian Journal of Cardiology* 22(9), 749-754.
- Seidel, H. M. (2006). *Mosby's guide to physical examination*. St. Louis, Mo: Mosby/Elsevier.
- The Criteria Committee of the New York Heart Association. Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels. 9th ed. Boston, Mass: Little, Brown & Co; 1994:253-256.

Developed by**CPD Developer Lead(s):**

Regional Heart Failure Coordinator, Cardiac Program, VCH & PHC

Other members:

MCN, RN, CCN(C), Regional Clinical Nurse Specialist for Heart Failure, VCH & PHC

RN, BSN, CCN(C), Regional Heart Failure Coordinator, VCH & PHC

Endorsed by

VCH: (*Regional SharePoint 2nd Reading*)

Health Authority Profession Specific Advisory Council Chairs (HAPSAC)

Health Authority & Area Specific Interprofessional Advisory Council Chairs (HAIAC)

Operations Directors

Professional Practice Directors

Regional Heart Failure Coordinator, Cardiac Program, VCH & PHC

Clinical Nurse Specialist, Regional Heart Failure Strategy, VCH & PHC

Final Sign-off & Approved for Posting by

Vice President, Clinical and Systems Transformation and Chief Nursing Officer & Executive Lead
Professional Practice, VCH

Executive Sponsor for Heart Failure Management (VCH & PHC) – VP Medical Affairs,
St. Paul's Hospital, PHC

Professional Practice Standards Committee - PHC

Date of Approval/Review/Revision

Approved: November 5, 2013

Posted: November 7, 2013

Appendix A: Heart Failure Pathway (page 1 of 2)



HEART FAILURE PATHWAY

Site: _____

	ACUTE PHASE		STABILIZATION PHASE		TRANSITION PHASE	
	Target: Day 1–2		Target: Day 3–5		Target: Day 6–7	
	Dates: _____		Dates: _____		Dates: _____	
				Initials		Initials
PATIENT OUTCOMES/ CLINICAL INDICATORS (Initial when completed)	1. HF orders completed 2. Medication reconciliation completed 3. LV function documented 4. EF: _____ % 5. Patient starting to diurese 6. Weights documented 7. Signs and symptoms of HF documented 8. Code status determined and documented		1. Weight trending down 2. Patient on ACEI or ARB and beta blocker therapy 3. Lab results within acceptable range 4. Able to increase activity without respiratory distress 5. Signs and symptoms of HF improving 6. Patient using Nicotine Replacement Therapy if needed		1. Presenting symptoms resolved 2. Signs and symptoms of HF improved 3. Tolerating HF medications 4. Weight stable on oral medications 5. Tolerating increased activity 6. Able to carry out ADL's 7. Lab results within stable range 8. O2 sat above 90% 9. Discharge prescription completed	
TEACHING	Initiate HF Teaching Record: 1. Introduce concept of HF 2. Reviews signs & symptoms 3. Instructions given for fluid restriction 4. Introduce Fluid Restriction Worksheet 5. Introduce the need for daily weights 6. Introduce importance of medications		Continued HF Teaching: 1. Maintains Fluid Restriction Worksheet 2. Introduce the concept of HF as a chronic condition 3. Discuss when to call with weight gain or worsening symptoms 4. Review how to read food labels 5. Discuss importance of daily activity and rest periods 6. Discuss Smoking Cessation if needed		Continued HF Teaching: 1. Maintains Fluid Restriction Worksheet 2. Identifies when/who to call with worsening symptoms or weight gain of 2Kg (4lbs) in 2 days or 2.5Kg (5lbs) in a week 3. Understands need for fluid and sodium restriction at home as prescribed 4. Understands importance of remembering to take medications at home 5. Discuss individual activity program for home 6. Understands the need to balance activity and rest 7. Understands prognosis 8. Understands importance of follow-up with GP 9. Advise the need for regular vaccinations	
DISCHARGE PLANNING	1. GP notified of admission 2. Document home situation 3. Evaluate supports 4. Identify possible barriers to discharge		1. Anticipate possible discharge date 2. Determine if supports or devices required for transition to home 3. Ask if patient has scale at home		1. Arrange follow-up with GP or other PCP within 2 weeks of discharge 2. Supports and devices arranged 3. Ensure patient has been given printed HF educational material and a written discharge summary 4. Prescription given	

VCH.0125 | MAR.2013

Page 1 of 2

Note: This is a **controlled** document for VCH & PHC internal use. Any documents appearing in paper form should always be checked against the electronic version prior to use. The electronic version is always the current version.

HEART FAILURE PATHWAY

Site: _____

GUIDELINES FOR ASSESSMENT & CARE: Obtain physician order for admission

Assessments	<ul style="list-style-type: none"> Daily am weight recorded, same scale being used Vitals per ward routine Intake recorded Assessment of cardiovascular and respiratory systems Document exercise capability 	<ul style="list-style-type: none"> Daily am weight recorded, same scale being used Vitals per ward routine Intake recorded Assessment of cardiovascular and respiratory systems Document progression of exercise capability 	<ul style="list-style-type: none"> Daily am weight recorded in chart, same scale being used Vitals per ward routine Intake recorded Assessment of cardiovascular and respiratory systems Determine if patient able to return to baseline level of function at home i.e. walk up stairs if necessary, perform self care, etc.
Diagnostics and Laboratory on Ward	<ul style="list-style-type: none"> In ED: CXR, ECG, labs INR daily if on warfarin EF on chart if not need ECHO 	<ul style="list-style-type: none"> Electrolytes and renal function as ordered and with medication changes INR daily if required Etiology work up if new diagnosis 	<ul style="list-style-type: none"> Labs results within stable range If no EF in hospital plan for outpatient ECHO
Treatments	<ul style="list-style-type: none"> IV or saline lock Telemetry if ordered Titrate oxygen as needed 	<ul style="list-style-type: none"> IV or saline lock Telemetry if ordered Titrate oxygen as needed 	<ul style="list-style-type: none"> IV discontinued Telemetry off Discontinue O2
Activity/Safety	<ul style="list-style-type: none"> Falls risk assessment done VTE risk assessment done Activity as tolerated or as ordered 	<ul style="list-style-type: none"> Patient increasing their activity, track progress Consider PT or OT consult if needed 	<ul style="list-style-type: none"> Patient safe to go home. Ambulation devices available for home if needed
Consults	<ul style="list-style-type: none"> As per admission orders. Consider: Pharmacist, dietitian, occupational therapy, physiotherapy, palliative care 	<ul style="list-style-type: none"> Ensure consults being done 	<ul style="list-style-type: none"> Home and Community Care if needed Specialty referrals in community Clinic referrals Consider cardiac rehabilitation
Medications	<ul style="list-style-type: none"> Medications reconciled 	<ul style="list-style-type: none"> Ensure tolerating doses, contact physician if any meds held or not taken. Consider titrating doses Consider switching IV medications to PO 	<ul style="list-style-type: none"> Patient on optimal dosing as tolerated orally Medication compliance discussed Instructions for vaccinations
Diet	<ul style="list-style-type: none"> Low sodium diet (less than 2 g) Heart healthy diet considered Fluid restriction worksheet at bedside 	<ul style="list-style-type: none"> Consider other dietary situations, high K+ foods or low K+ foods, DM, renal diet. Consider dietary consult 	<ul style="list-style-type: none"> Patient understands how to read food labels Teaching done with person who cooks meals and person who shops for food

Appendix B: Precipitating Factors/Triggers for Decompensated Heart Failure

Being familiar with the precipitating factors in exacerbation of HF forms the basis of supporting patients in their self-management. Common precipitating factors or triggers in decompensated HF are:

1. Drug therapy
 - a. Non-adherence
 - b. Inappropriate medications (e.g. Non-steroidal anti-inflammatory agents)
2. Increased metabolic demands
 - a. Infections (e.g. influenza, pneumonia, UTI, sepsis)
 - b. Anemia
 - c. Tachycardia (HR greater than 100/min)
3. Fluid overload (increased preload)
4. Poor understanding of or non-adherence to:
 - a. Self monitoring of weight and symptoms of fluid overload
 - b. Sodium (salt) restriction
 - c. Fluid restriction
5. Increased afterload (resistance against which heart must pump blood)
 - a. Hypertension
 - b. Vasoconstriction
6. Impaired contractility
 - a. Coronary ischemia or myocardial infarction
 - b. Pump failure
 - c. Medications that weaken heart's contractility (negative inotropes)
 - d. Arrhythmia (bradycardia or tachycardia)
 - e. Malfunctioning pacemaker
 - f. Electrolyte imbalance
7. Smoking
8. Alcohol/substance abuse

Appendix C: Medications commonly used in Heart Failure

Medications are used in HF to relieve or improve symptoms, improve exercise tolerance, reduce the risk of death, slow the progression of the disease, and prevent hospitalization. Below are the drugs most commonly used.

Medication	Purpose	Examples	Considerations
Diuretics	Used to relieve congestion and edema.	a. Furosemide b. Metolazone c. Hydrochlorothiazide	<ul style="list-style-type: none"> monitor electrolytes and renal function weigh patient daily when acute congestion is cleared, the lowest effective dose should be used for persistent volume overload, a thiazide diuretic (such as metolazone or hydrochlorothiazide) may be added
Angiotensin Converting Enzyme Inhibitors (ACE I)	Antihypertensive agents that suppress activation of the renin-angiotensin aldosterone system to reverse vasoconstriction, prevent sodium and fluid retention. After a heart attack, prevents remodeling of the heart	a. captopril b. enalapril c. lisinopril d. perindopril e. ramipril f.trandolapril	<ul style="list-style-type: none"> recommended for all HF patients with an EF less than or equal to 40% shown to improve survival in those with HF monitor BP, serum potassium, renal function allow for a 30% increase in creatinine Patients may experience a persistent dry cough. If bothersome, prescriber may switch to angiotensin receptor blocker Contraindications include: <ul style="list-style-type: none"> a. Acute renal failure b. Angioedema c. Allergy
Angiotensin Receptor Blockers (ARB)	Antihypertensive agents that suppress activation of the renin-angiotensin aldosterone system to reverse vasoconstriction and prevent sodium and fluid retention. After a heart attack prevents remodeling of the heart.	a. candesartan b. losartan c. valsartan	<ul style="list-style-type: none"> Recommended for patients who do not tolerate an ACE inhibitor due to dry cough Monitor BP, serum potassium, renal function Allow for a 30% increase in creatinine
Beta Blockers (BB)	Blocks neurohormonal effects of the sympathetic system on the heart, and over time, improves symptoms of heart failure and LV function	a. bisoprolol b. carvedilol d. metoprolol	<ul style="list-style-type: none"> Recommended for all HF patients with an EF less than or equal to 40% Patients should be stabilized prior to initiation Monitor HR and BP

Note: This is a **controlled** document for VCH & PHC internal use. Any documents appearing in paper form should always be checked against the electronic version prior to use. The electronic version is always the current version.

Medication	Purpose	Examples	Considerations
	Can also be used to reduce HR, angina symptoms and blood pressure		<ul style="list-style-type: none"> Patients often feel more fatigued when first starting on a BB, however it is important they continue taking the medication. This usually improves with time (sometimes as long as 3 months). Beta blockers should not be stopped suddenly. <p>Some common contraindications include:</p> <ol style="list-style-type: none"> Reactive airways disease (e.g. Asthma) Cocaine use Severe fluid overload Bradycardia Allergy
Aldosterone Antagonists	Blocks the negative effects of aldosterone on the heart to prevent hypertrophy and fibrosis. Can also be used for blood pressure or as a mild diuretic.	<ol style="list-style-type: none"> Spironolactone Eplerenone 	<ul style="list-style-type: none"> Treatment of HF to manage symptoms and to improve survival Monitor renal function and serum potassium (elevated K+)
Digoxin	Positive inotrope; improves symptoms of heart failure. Can also be used for rate control in atrial fibrillation	Digoxin	<ul style="list-style-type: none"> Used in HF patients who continue to have symptoms despite optimal HF therapy Also used in patients with chronic atrial fibrillation and poor HR control despite optimal BB therapy or if BB can not be used Monitor for signs of digoxin toxicity (loss of appetite, nausea or vomiting, confusion and/or bradycardia). Digoxin levels should be assessed if: <ul style="list-style-type: none"> toxicity is suspected another medication that interacts with digoxin is started or stopped the patient's renal function has changed significantly Monitor potassium levels as digoxin can cause arrhythmias in the presence of hypokalemia
Vasodilators	Hydralazine/nitrate combination can be used in place of ACEI or ARB in the setting of severe renal impairment or in addition to standard therapy in refractory HF	<ol style="list-style-type: none"> hydralazine isosorbide dinitrate 	<ul style="list-style-type: none"> Frequent dosing may be less convenient for patients Used in addition to standard therapy for black Canadians with systolic HF

Note: This is a **controlled** document for VCH & PHC internal use. Any documents appearing in paper form should always be checked against the electronic version prior to use. The electronic version is always the current version.

Appendix D: Medications to avoid in Heart Failure

The following medications should be avoided in patients with HF as they may lead to worsening symptoms.

Drug	Reason to Void
Nonsteroidal anti-inflammatory (NSAIDs)	May cause fluid retention Increase risk of renal impairment while patient is on ACEI/ARBs or diuretics
Corticosteroids	Avoid if possible. May cause fluid retention
Non-dihydropyridine (DHP) calcium channel blockers (CCB) including verapamil and diltiazem.	Non-DHP CCBs are negative inotropes and chronotropes and can worsen heart failure. All CCBs can worsen leg edema (swelling)
Glitazones type antidiabetic agents	May cause or worsen heart failure
Some vitamins and herbal medications	Insufficient data to support use. Some (e.g. Vitamin E) actually increase HF hospitalizations
Dronedarone	May cause or worsen heart failure

Appendix E: Limb edema scale

0	None
+	Slight pitting (2 mm), no visible distortion, disappears rapidly
++	A somewhat deeper pit than + (4 mm), no distortion and disappears in 10 to 15 seconds
+++	Noticeably deep pit (6 mm) that may last more than a minute; the dependent extremity looks fuller and swollen
++++	Very deep pit (8 mm) that lasts as long as 2 to 5 minutes and the dependent extremity is grossly distorted

Seidel, H. M. (2006). *Mosby's guide to physical examination*. St. Louis, Mo: Mosby/Elsevier.

Appendix F: New York Heart Association (NYHA) Heart Failure Symptom scale

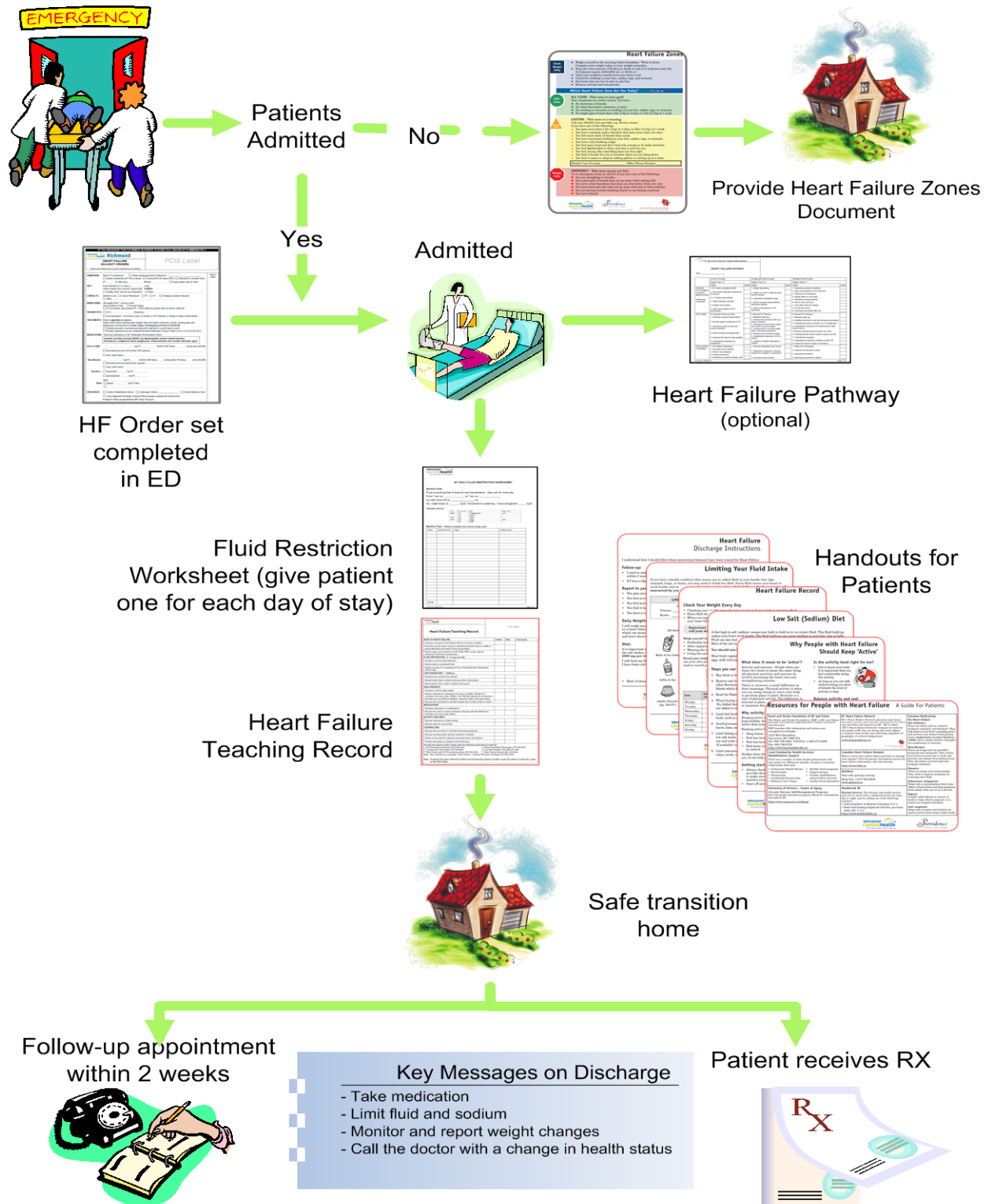
NYHA Heart Failure Scale

Class I	No symptoms and no limitation in ordinary physical activity, e.g. dyspnea when walking, climbing stairs etc.
Class II	Mild symptoms (mild dyspnea and/or angina) and slight limitation during ordinary activity.
Class III	Marked limitation in activity due to symptoms, even during less-than-ordinary activity, e.g. walking short distances (20 to 100 metres). Comfortable only at rest.
Class IV	Severe limitations. Experiences symptoms even while at rest. Patients are mostly bedbound

The Criteria Committee of the New York Heart Association. Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels. 9th ed. Boston, Mass: Little, Brown & Co; 1994:253-256.

Appendix G: Heart Failure Flow Map

Heart Failure Flow Map



Note: This is a **controlled** document for VCH & PHC internal use. Any documents appearing in paper form should always be checked against the electronic version prior to use. The electronic version is always the current version.