



**CorHealth  
Ontario**

*Advancing cardiac, stroke  
and vascular care*

# **Chronic Heart Failure:**

General information and practical tips for  
health care providers

# About CorHealth Ontario

As of June 22, 2017, we are CorHealth Ontario, an organization formed by the merger of the Cardiac Care Network of Ontario and the Ontario Stroke Network, with an expanded mandate spanning cardiac, stroke and vascular through the entire course of care including secondary prevention, rehabilitation and recovery. CorHealth Ontario proudly advises the Ministry of Health and Long Term Care, Local Health Integration Networks, hospitals, and care providers to improve the quality, efficiency, accessibility and equity of cardiac, stroke and vascular services for patients across Ontario. For more information, visit [corhealthontario.ca](http://corhealthontario.ca).

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# What is Heart Failure?

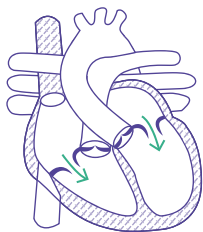
Heart failure (HF) is a condition when the heart is unable to pump enough blood to meet the metabolic demands of the body.

The most common symptoms of heart failure include: shortness of breath (SOB), fatigue, and edema. Heart failure symptoms can occur in the absence of fluid over-load or 'congestion', and therefore the term 'congestive heart failure' has been changed to 'heart failure'.

Although there are many causes of heart failure, the most common causes include coronary artery disease and hypertension.

## Heart Failure and Ejection Fraction

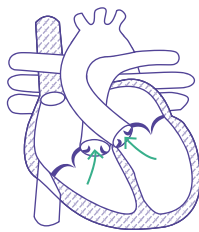
Left ventricular ejection fraction (LVEF): The % of blood pumped out of the left ventricle with each beat. Normal LVEF >55%



**HF with preserved EF:**  
LVEF > 40% ('HF-pEF')

### Stiff Heart Muscle

Trouble filling during ventricular diastole



**HF with reduced EF:** LVEF  
≤ 40% ('HF-rEF')

### Weak Heart Muscle

Trouble ejecting blood during ventricular systole

# Symptoms of Heart Failure

Shortness of breath (SOB) and fatigue are the most commonly reported symptoms of HF. The following section outlines a number of symptoms that can be related to HF.

Symptoms can occur in the absence of fluid overload, or congestion, and therefore the term 'congestive heart failure' has been changed to 'heart failure'.

<b>Symptoms</b>	<b>Description</b>
<b>Shortness of Breath (SOB)</b>	<ul style="list-style-type: none"><li>• Usually occurs on exertion or, with more severe HF can occur at rest.</li><li>• Can be a result of many reasons including, but not limited to: inadequate cardiac output, fluid retention, deconditioning, or skeletal muscle weakness</li></ul>
<b>Fatigue</b>	<ul style="list-style-type: none"><li>• Decreased exercise tolerance</li><li>• Can be a result of many reasons including, but not limited to: inadequate cardiac output, fluid retention, deconditioning, or skeletal muscle weakness</li></ul>
<b>Edema</b>	<ul style="list-style-type: none"><li>• May be present in the lower extremities, abdomen, sacrum, scrotum or generalized</li></ul>

<b>Symptoms</b>	<b>Description</b>
<b>Orthopnea</b>	<ul style="list-style-type: none"> <li>• SOB when lying flat</li> <li>• Change in position to sitting upright usually relieves orthopnea</li> <li>• Occurs due to redistribution of fluid from lower extremities when lying recumbent, increasing pulmonary capillary pressure</li> </ul>
<b>Paroxysmal Nocturnal Dyspnea (PND)</b>	<ul style="list-style-type: none"> <li>• Wake up suddenly with severe SOB</li> <li>• Anxiety and a sense of suffocation may be associated symptoms</li> <li>• Occurs due to redistribution of fluid from lower extremities when lying recumbent, leading to pulmonary edema</li> </ul>
<b>Cough</b>	<ul style="list-style-type: none"> <li>• Chronic, non-productive cough worse when lying down is often associated with pulmonary congestion</li> <li>• May be due to pulmonary, cardiac or gastric causes or may be a side effect of medication (e.g. ACE inhibitor)</li> </ul>
<b>Wheezing</b>	<ul style="list-style-type: none"> <li>• May be present at rest or with exertion and occurs in the setting of fluid overload</li> <li>• May be caused by congestion of bronchial mucosa and compression of small bronchi</li> </ul>

<b>Symptoms</b>	<b>Description</b>
<b>Gastrointestinal Symptoms</b>	<ul style="list-style-type: none"> <li>• Abdominal fullness/bloating/discomfort, nausea, poor appetite, early satiety, constipation</li> <li>• May be due to ascites, gut edema, passive liver congestion with fluid retention</li> <li>• Constipation may be due to fluid shifting from intravascular space into tissues</li> </ul>
<b>Weight gain</b>	<ul style="list-style-type: none"> <li>• Rapid weight gain: 2 pounds (1 Kg)/day or 5 pounds (2 Kg)/week</li> </ul>
<b>Atypical Symptoms</b>	<ul style="list-style-type: none"> <li>• More common in the elderly</li> <li>• May include functional decline, falls, depression, insomnia or nocturia</li> </ul>



# NYHA Classifications

The New York Heart Association (NYHA) classification system is used to describe the level of functional impairment from HF symptoms. The NYHA class also helps define the goals of treatment. Depending on symptom control, patients may fluctuate between the NYHA classes representing periods of exacerbation and the need for urgent or acute care in the context of a chronic condition.

Of note, there is no relationship between the strength of the heart muscle and NYHA class. For example, a person with a weak heart muscle may have NYHA II symptoms while someone else with a stiff heart muscle and normal ejection fraction may have NYHA III symptoms.

## NYHA Class      Symptom Severity

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**1**

No limitation of physical activity. Ordinary physical activity does not cause fatigue, palpitations, or SOB.

**2**

Slight limitation of physical activity. Mild HF symptoms (SOB, angina) during ordinary physical activity.

**3**

Moderate limitations of physical activity. Comfortable at rest, but less than ordinary activity causes fatigue, palpitations or SOB.

**4**

Symptoms of heart failure at rest. Unable to carry out physical activity without discomfort.

# Severity and Status (e.g. same/better/worse) of HF Symptoms

It is important to note the current status of a person's HF symptoms, in addition to determining if they are the same/better/or worse.

**Note:** If a person's HF symptoms are getting worse, try to problem solve to identify possible triggers for the change. Identifying and managing the trigger(s) is required for improving and stabilizing HF symptoms.

<b>Questions to Ask</b>	<b>Clinical Concerns to Report</b>
<b>Current level of activity and limiting factor</b>	
<p>If you and I could go for a walk, your pace, no hills, how long could you walk for?</p> <p>What would limit you from walking any further (e.g. breathing, fatigue, arthritis)?</p> <p>How does this compare to what you did last month/week (time frame dependent on patient situation)?</p>	<ul style="list-style-type: none"><li>• Declining functional capacity</li></ul>

<b>Questions to Ask</b>	<b>Clinical Concerns to Report</b>
<b>SOB</b>	
<p>What types of activities make you short of breath?</p> <p>Are there any of your usual activities you are avoiding because they will make you short of breath?</p>	<ul style="list-style-type: none"> <li>• Increasing SOB or SOB at rest</li> </ul>
<b>Orthopnea</b>	
<p>How many pillows do you sleep with under your head? Is the head of your bed elevated?</p> <p>Do you sleep in a chair or recliner?</p> <p>If yes, does your breathing get better when you sit up? How frequent are these episodes?</p>	<ul style="list-style-type: none"> <li>• Any symptoms of orthopnea</li> </ul>
<b>Paroxysmal Nocturnal Dyspnea (PND)</b>	
<p>Do you wake up suddenly in the middle of the night gasping for air? Does it seem better when you sit up?</p> <p>How frequent are these episodes?</p>	<ul style="list-style-type: none"> <li>• Any symptoms of PND</li> </ul>

Questions to Ask	Clinical Concerns to Report
<b>Peripheral Fluid Retention</b>	
<p>Have you noticed any swelling in your feet or ankles?</p> <p>Can you fit into your regular shoes?</p> <p>Does this swelling go away by the next morning?</p> <p>Do you feel like your belly/abdomen is bloated? (If yes, are you constipated?)</p> <p>Has your daily weight changed? (If yes, how much weight increase and time frame?)</p>	<ul style="list-style-type: none"> <li>• Edema that does not resolve by the next morning</li> <li>• Abdominal fullness in the absence of constipation</li> <li>• Weight gain of 2 pounds (1Kg)/day or 5 pounds (2 Kg)/week</li> </ul>

<p style="text-align: center;"><b>Questions to Ask</b></p>	<p style="text-align: center;"><b>Clinical Concerns to Report</b></p>
<b>Volume Depletion</b>	
<p>Do you ever get lightheaded? (if yes, explore situation further)</p> <p>Have you had any falls? (if yes, explore situation further)</p> <p>Has your daily weight changed? (If yes, how much weight loss and time frame)</p>	<ul style="list-style-type: none"> <li>• It is normal to have some postural light headedness; however, it should not interfere with regular activities or be unsafe</li> <li>• Any episodes of falling or syncope</li> <li>• Weight loss of &gt; 2 pounds (1 Kg)/ day or 5 pounds (2 Kg)/ week</li> <li>• Diarrhea for more than 2 days</li> </ul>
<b>Arrhythmia</b>	
<p>Do you ever feel like your heart is racing and it makes you feel unwell? (if yes, explore situation further)</p> <p>Have you ever fainted? (if yes, explore situation further)</p>	<ul style="list-style-type: none"> <li>• Prolonged palpitations</li> <li>• Fainting (syncope)</li> </ul>

# Exam Findings That Specifically Relate to Heart Failure:

## General Appearance

- Does patient look ill, well or malnourished?
- Does the patient look frail?
- Use of assistive devices
- Skin colour, presence of pallor or cyanosis
- Shortness of breath or orthopnea during the visit or exam? (Tip - do they get short of breath when they lie down?)
- Pitting edema - feet, ankles, legs, sacrum (can they fit into their shoes?)
- Current weight and any changes in weight in the last week?

## Vital Signs

- There is no consistent change in vital signs that always indicate fluid overload.
- Heart rate and blood pressure readings must be interpreted in combination with other findings.
- Check for postural drop in blood pressure to assess for fluid depletion (e.g. diuretics too strong).
- Low blood pressure is not unusual.
- Low blood pressure is a concern if patients feel unwell, lightheaded, dizzy, more tired than usual or report falling or fainting.
- Consult with a physician before advising a patient not to take heart failure medications when blood pressure is low.

## Jugular Venous Pressure (JVP)

- The JVP reflects the ability of the heart to accommodate venous return. The JVP can be elevated when someone has increased fluid volume, even in the absence of peripheral edema.
- When people complain of abdominal bloating but have no obvious edema- JVP great clue for fluid status.
- Normal JVP  $\leq 4$  cm above the sternal angle.
- Quick clue- if you can see the JVP while they are sitting, it is elevated.
- JVP- "fat when flat"- easiest to see when someone lying down.
- The JVP can also be increased for other reasons such as: tricuspid regurgitation; pulmonary hypertension; complete heart block (right atrium contracting against a closed tricuspid valve).

## Pulmonary Assessment

- Crackles – not cleared by coughing, caused by excessive fluid in the airspaces.
- Crackles in early inspiration denote CHRONIC condition, crackles at end inspiration more often indicate fluid in the airspaces (heart failure)
- Wheezes – may be caused by bronchial edema from worsening HF. Can be on inspiration or expiration

**Hemoptysis** — frank blood, or pink tinged frothy sputum is indicative of acute pulmonary edema due to rupture of engorged bronchial veins, anticoagulation may worsen. Often a medical emergency.

**NOTE** — some patients may have relatively clear lungs on examination but can still be fluid overloaded.

# Medication Pathway for Chronic Heart Failure (LVEF $\leq$ 40%)

## Source:

CCS Guidelines, 2015  
([www.ccs.ca](http://www.ccs.ca))

## ACE inhibitor

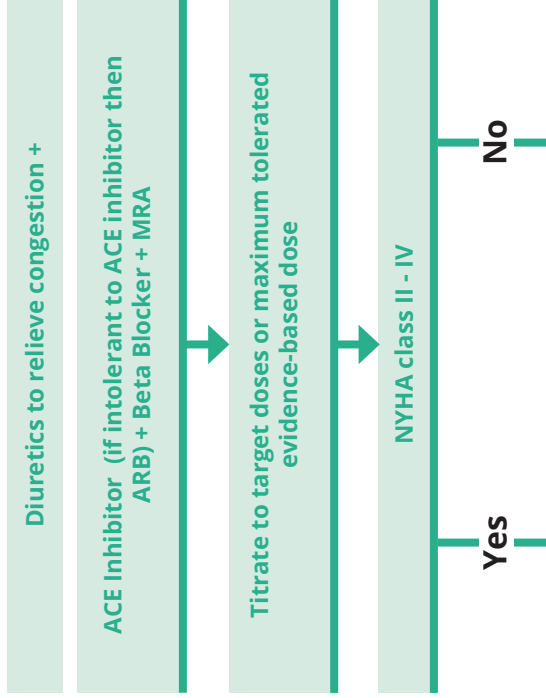
Angiotensin converting enzyme inhibitor

## ARB

Angiotensin II receptor blocker

## BB


Beta blocker






## MRA

Mineralocorticoid  
receptor antagonist



Consider referral  
to specialist for  
consideration of  
additional therapy



Continue routine  
disease management  
follow-up

**Note:** Entresto™ ( Sacubitril/ Valsartan) and Lancora™ (Ivabradine) are now approved for use in Canada. Please see page 12 for general information regarding these medications.

**LVEF > 40%  
Medication**

- Control of hypertension per current guidelines is critical
- Control of resting heart rate <70 bpm

# Medication Chart for Chronic Heart Failure (LVEF $\leq$ 40%)

<b>ACE INHIBITOR</b>	Enalapril	1.25-2.5 mg BID	10 mg BID
	Lisinopril	2.5-5 mg daily	20-35 mg daily
	Perindopril	2-4 mg daily	4-8 mg daily
	Ramipril	1.25-2.5 mg BID	5 mg BID
	Trandolapril	1-2 mg daily	4 mg daily
<b>BB</b>	Bisoprolol	1.25 mg daily	10 mg daily
	Carvedilol	3.125 mg BID	25 mg BID 50 mg BID (> 85 kg)
	Metoprolol CR/XL	12.5-25 mg daily	200 mg daily <sup>t</sup>
<b>ARB</b>	Candesartan	4 mg daily	32 mg daily
	Valsartan	40 mg BID	160 mg BID

<b>MRA</b>	Spironolactone	12.5 mg daily	50 mg daily
	Eplerenone	25 mg daily	50 mg daily
<b>VASODILATORS</b>	Hydralazine	37.5 mg TID	75 mg TID
	Isorbide Dinitrate	20 mg TID	40 mg TID
<b>ARNI</b>	Sacubitri/ Valsartan (Entresto™)	50-100 mg BID	200 mg BID
	Ivabradine (Lancora™)	2.5-5 mg BID	7.5 mg BID

## **I<sub>f</sub> INHIBITOR**

**Note:** - Drugs and doses may vary and depend upon the clinical scenario.

† Not available in Canada. Limited evidence of short-acting metoprolol tartrate in HF.

**Note:** - For information regarding Entresto™ and Lancora™, see medication tips, page 12.

**Note:** - Patients prescribed Entresto™ should not be taking an ACE Inhibitor

# Medication Tips

<b>Loop Diuretics Lasix</b>	<ul style="list-style-type: none"><li>• Avoid taking after 4pm</li><li>• Recheck renal function, electrolytes within 7 days after a change in dose</li><li>• Burinex - better GI absorption than Lasix when gut edema (cost of medication needs to be considered)</li></ul>
<b>Metolazone</b>	<ul style="list-style-type: none"><li>• Means trouble if patient not closely monitored (volume status, kidneys, potassium)</li><li>• Recheck renal function, electrolytes within 2 days after a change in dose</li><li>• Consider using a low dose (1.25mg - 2.5mg) sparingly or periodically rather than daily dosing</li><li>• Most effective when taken 30 mins before the Lasix dose</li></ul>
<b>Titrating ACE Inhibitor/ ARB/MRA</b>	<ul style="list-style-type: none"><li>• Baseline renal function, potassium</li><li>• Renal function, Potassium (blood work within 7-10 days of any change in dose)</li><li>• Asymptomatic low blood pressure is OK</li></ul>
<b>Digoxin</b>	<ul style="list-style-type: none"><li>• Low dose (trough level &lt;1.0 nmol/L)</li><li>• Be very careful with elderly, renal impairment</li><li>• Not first choice of medication- can increase mortality if dose too high.</li><li>• "Caution with digoxin."</li></ul>

## Titrating Beta Blocker (BB)

### Note:

- Asymptomatic low blood pressure OK
- May experience worse HF symptoms with dose increase (symptoms occur within 1-2 weeks, treat with temporarily increasing diuretic versus decrease BB if possible)
- Exercise caution increasing the dose when:
  - Any extra fluid on board (can't be 'wet'-will feel worse with increase)
  - Symptomatic low pulse (<60) or low blood pressure
  - New conduction delays on EKG

## Low Blood Pressure

- Stagger dose of ACE inhibitor/ARB and Beta Blocker (at least 2 hours between medications)
- Consider splitting daily dose to BID
- Start with low doses and increase slowly (monthly vs every 2 weeks) (reduces side effects)
- When trying to titrate ACE Inhibitor, ARB or Beta Blocker, consider only increasing the PM dose. If tolerated, then increase the AM dose at the next visit.
- Use Bisoprolol rather than Carvedilol (more Beta 1 selective)
- Give beta blocker with meals (slows absorption)
- Consider decreasing diuretic

## New Medications

### Entresto™ (New Medication)

- Nephrylisin inhibitor (Sacubitril) + ARB (Valsartan)
- Replaces ACE inhibitor (or ARB) for patients with symptomatic HF despite optimal dose of ACE inhibitor/ARB, BB, and MRA
- Monitor renal function, potassium - as per ACE inhibitor
- Closely monitor blood pressure for symptomatic hypotension
- Do not prescribe an ACE inhibitor if taking Entresto™ (angioedema)
- When changing from ACE inhibitor to Entresto™, avoid ACE inhibitor for 36 hours (angioedema)

**Lancora™  
(Ivabradine)  
(New  
Medication)**

- Indicated for people with stable and symptomatic HF, an EF  $\leq$  35%, in sinus rhythm and with a resting heart rate of  $\geq$  77 beats per minute who:
  - Cannot tolerate a beta blocker; OR
  - Cannot tolerate the full strength of a beta blocker and continue to have a resting heart rate  $\geq$  77 beats per minute.
  - For people already taking a beta blocker and continue to have a heart rate  $\geq$  77 beats per minute, Lancora™ is added to the regimen and does not replace the beta blocker.
- Closely monitor heart rate and rhythm
- Must take medication with food (e.g. breakfast and dinner)
- Cannot take medication with grapefruit juice (>2 fold medication exposure)
- Unlike beta blockers and most calcium channel blockers, Lancora™ does not decrease contractility or reduce blood pressure
- Unlike beta blockers, there is no rebound tachycardia if stopped abruptly

# Self-Care Process

<b>Definition</b>	<b>Application</b>
<b>Maintenance</b>	
<p>Adherence to Treatment:</p> <ul style="list-style-type: none"><li>• Taking medication</li><li>• Exercise</li><li>• Dietary advice</li><li>• Lower risk factors</li></ul>	<p>What do I need to do to feel well and prevent my heart failure symptoms from getting worse?</p>
<b>Symptom Perception</b>	
<p>Detection of physical change and interpretation of the meaning:</p> <ul style="list-style-type: none"><li>• Monitoring</li><li>• Recognition</li><li>• Interpretation</li></ul>	<p>What are my symptoms of heart failure and are they different from my usual pattern?</p>
<b>Management</b>	
<p>Responding to symptoms when they occur:</p> <p>Independent decisions or provider-directed decisions</p>	<p>What do I need to do when my symptoms are changing?</p>



# Factors Affecting Self-Care

<b>Domain</b>	<b>Description</b>
<b>Confidence</b>	<p>Self-Care confidence is both a moderator and mediator. Strategies to improve patient self-care confidence include: counseling to recognize benefits and help overcome barriers of self-care, reinforcing positive behaviours, setting mutual and realistic goals, and celebrating successes.</p>
<b>Cognitive Status</b>	<p>Subtle cognitive deficits often go undetected but can interfere with learning and problem solving. Consider screening (ie. MOCA test) for mild cognitive impairment in patients with ongoing challenges with engaging in self-care.</p> <p>Consider underlying subtle delirium if you notice trouble with attention (e.g., infection, recent ETOH, side effects from medications).</p>

<b>Domain</b>	<b>Description</b>
<b>Health Literacy</b>	<p>Patients' ability to understand health and medical issues and directions is related to the clarity of the communication. HCPs need to be sensitive to the individual factors that may impact health literacy as well as the degree of difficulty of the self-care activity requested (e.g. self-titration of diuretics may be too difficult for many patients).</p>
<b>Emotional Status</b>	<p>Consider screening for symptoms of depression/anxiety in patients with ongoing challenges with engaging in self-care. Consider screening for depression using 2 simple questions from the Patient Health Questionnaire-2.</p> <p>HCP - Health Care Providers</p>

<b>Domain</b>	<b>Description</b>
<b>Learning Environment</b>	<p>Patients need a safe environment (e.g. not punitive) to explore real or potential situations where self-care is difficult. Patients experience many difficulties despite deliberate attempts to make healthy choices, Watch for “unintentional non-adherence”. Common triggers are often tinned soup, processed foods, restaurant food, holiday meals or over- the-counter medications that cause fluid retention. Creative problem solving, cognitive-behavioral strategies and mutual goal setting are necessary.</p>
<b>Learning Over Time</b>	<p>Self-Care is a skill and requires practice and learning over time. Let patients know that others have difficulties and encourage them to share concerns and problems.</p>

<b>Domain</b>	<b>Description</b>
<p><b>Personalization of self-care symptom monitoring and management</b></p>	<p>Information on 'how' to apply self-care information into daily lives is necessary. Help patients work through their experience and strategies for self-care as opposed to reiterating self-care tasks and recommendations.</p> <p>Teach-back technique has been shown to be effective.</p>
<p><b>Family Caregivers</b></p>	<p>Caregivers often provide a substantial amount of support for patient self-care activities and need to be seen as partners in the overall care plan. Their contribution to self-care cannot be underestimated.</p>

## Liability

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