**Summary: Diagnosing patients with heart failure in primary care**

### Assess the probability of heart failure:

**Patient history**
- History of coronary artery disease or hypertension?
- Past use of diuretics?
- Drug-induced causes?

**Physical examination**
- Any signs of heart failure?
- NYHA functional class? (see main article)

**Consider ECG**
- Any abnormality?

### Significant symptoms or signs?

- Hospital admission

### Assess the probability of heart failure:

- **Patient history**
- **Physical examination**
- **Consider ECG**

### Assess the probability of heart failure:

- Any concerning but non-urgent features?

### All normal?

- **Heart failure unlikely**
  - Consider other diagnoses

### BNP threshold met?†

- LVEF $\geq 50\%$
  - and evidence of relevant structural heart disease**
  - and/or diastolic dysfunction with high filling pressure

### LVEF $< 50\%$

- Heart failure with **reduced** ejection fraction (HFrEF) confirmed

- Heart failure with **preserved** ejection fraction (HFpEF) confirmed

### Refine treatment based on results; refer to secondary care if needed

**Common blood tests for heart failure:**
- BNP/NT-proBNP
- Complete blood count
- Electrolytes and renal function
- Liver function
- Thyroid function
- HbA$_1c$ and lipids as part of a CVD risk evaluation

**Other blood tests as appropriate:**
- Thyroid function
- CRP if infection is suspected
- Serum troponin if acute onset of symptoms or an acute coronary syndrome is possible
- Iron studies (including iron levels, ferritin, transferrin saturation)**

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* See the main article for the symptoms and signs of heart failure; † Detection of elevated BNP levels is sufficient to establish a working diagnosis of heart failure (see the main article for specific thresholds), however, an echocardiogram is still important for confirmation and for guiding long-term management; ** Such as left ventricular hypertrophy or left atrial enlargement; ‡ Conventional thresholds for diagnosing iron deficiency (usually serum ferritin $< 20$ micrograms/L) are not reliable in patients with heart failure as this condition involves a systemic inflammatory state and ferritin levels increase in response to inflammation; therefore this wider panel of tests is recommended. See the main article for more information.

**Abbreviations:** BNP, brain natriuretic peptide; CRP, C-reactive protein; CVD, cardiovascular disease; ECG, electrocardiogram; HbA$_1c$, glycated haemoglobin; LVEF, left ventricular ejection fraction; NYHA, New York Heart Association.
**Summary: Managing patients with heart failure in primary care**

**Patient with HFrEF or an undifferentiated clinical diagnosis of heart failure (i.e. echocardiography results are not yet available)**

1. **Prescribe loop diuretic, e.g. furosemide**
   - **Use thiazide diuretic** if loop diuretic contraindicated or not tolerated

2. **Are features of fluid overload present?**
   - **YES**
     - **Prescribe ACE inhibitor immediately and a beta-blocker once any features of fluid overload have resolved**
   - **NO**

3. **Is the patient still symptomatic despite maximum tolerated doses of ACE inhibitor/ARB and beta blocker?**
   - **YES**
     - **Add either:**
       - A mineralocorticoid receptor antagonist to the regimen, e.g. spironolactone; or
       - An ARNI to the regimen and stop the ACE inhibitor/ARB
   - **NO**

4. **Is the patient still symptomatic despite maximum tolerated doses?**
   - **NO**
   - **YES**
     - **Refer to patient to cardiologist (or emergency department, if required)**

5. **Worsening or concerning symptoms?**
   - **YES**
   - **NO**

**Management should also include:**

**Additional medicines based on patient co-morbidities.** For example:

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Co-morbidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digoxin</td>
<td>Atrial fibrillation</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td></td>
</tr>
<tr>
<td>Intravenous iron</td>
<td>Anaemia and iron deficiency</td>
</tr>
<tr>
<td>SGLT-2 Inhibitor</td>
<td>Type 2 diabetes</td>
</tr>
</tbody>
</table>

**Non-pharmacological support:**
- Exercise, as appropriate
- Reduce sodium intake (<2 – 3 g daily)
- Weight loss
- Adequate fluid intake (1.5 – 2 L daily)
- Reduce alcohol/smoking cessation, if relevant
- Influenza/pneumococcal vaccination

See the main text for treatment and monitoring considerations relating to:

1. Loop diuretics
2. ACE inhibitors/ARBs and beta blockers
3. Mineralocorticoid receptor antagonists and ARNIs
4. Additional medicines for co-morbidities

*If a patient with heart failure has severe symptoms at presentation, they can potentially be cautiously initiated on an ACE inhibitor, beta blocker and spironolactone (i.e. at the same time) according to clinical judgement. However, a beta blocker should not be used unless the patient is euvolemic, and more frequent initial monitoring would be required. See main text for more further information on treatment requirements associated with each medicine or visit the NZ Formulary (NZF) at nzf.org.nz for specific dosing information.

**Abbreviations:** ACE inhibitor, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blockers; ARNI, angiotensin receptor II blocker with a neprilysin inhibitor; SGLT-2 Inhibitor, Sodium glucose co-transporter-2 inhibitor.