

# Diagnosis and management of chronic heart failure

Updated October 2011

This quick reference guide is derived from the National Heart Foundation of Australia and Cardiac Society of Australia and New Zealand *Guidelines for the prevention, detection and management of chronic heart failure in Australia. Updated October 2011.*

The recommendations are not prescriptive. Clinical judgement and individual patient circumstances will determine the most appropriate care.

Please refer to the updated full guidelines for more information about positive trials that warranted an update to the 2006 chronic heart failure (CHF) guidelines.

## Key messages

- Optimal management of CHF improves quality of life, reduces hospitalisation rates and prolongs survival for people with this condition.
- Echocardiography is the single most useful test in the evaluation of heart failure, and is necessary to confirm the diagnosis.
- Plasma B-natriuretic peptide (BNP) measurements may be useful in excluding CHF.
- Try to distinguish systolic heart failure from heart failure with preserved systolic function (diastolic heart failure) to guide management and help determine prognosis.
- Check for, and treat, iron deficiency in people with CHF to improve their symptoms, exercise tolerance and quality of life.
- Educate people with CHF about lifestyle changes (e.g. increase physical activity levels, reduce salt intake and manage weight). Help them make these changes, and routinely include psychosocial assessment in their management plan.
- Educate people with CHF about CHF symptoms and how to manage fluid load.
- Avoid prescribing drugs that exacerbate CHF (see page nine).
- Use a multidisciplinary care approach for people with CHF – consider Chronic Disease Management (CDM) Medicare items.
- Prescribe angiotensin-converting enzyme inhibitors (ACEI) at effective doses for people with all grades of systolic heart failure, and titrate to the highest recommended dose tolerated.

- Angiotensin II receptor antagonists (ARA) may be used as alternatives in people who cannot tolerate ACEIs. ARAs should also be considered for reducing morbidity and mortality in people with systolic CHF who remain symptomatic despite receiving ACEIs, although aldosterone antagonists would be preferred in this setting.
- For people with stabilised systolic heart failure who remain symptomatic despite appropriate doses of an ACEI, prescribe beta-blockers that have been shown to improve outcome in heart failure (e.g. bisoprolol, carvedilol, extended-release metoprolol or nebivolol). Titrate to the highest recommended dose tolerated.
- Prescribe diuretics, digoxin and nitrates for people already using ACEIs and beta-blockers to manage symptoms as indicated.
- Consider prescribing fish oils for people with symptomatic systolic HF after ACEIs and beta-blockers.
- For people who have severe systolic heart failure (New York Heart Association (NYHA) Class III-IV) despite appropriate doses of ACEIs and diuretics, consider prescribing spironolactone.
- Consider prescribing eplerenone for people with systolic heart failure who still have mild (NYHA Class II) symptoms despite receiving standard therapies with ACEIs and beta-blockers.
- Consider direct sinus node inhibition with ivabradine for people with CHF who have impaired systolic function, have had a recent heart failure hospitalisation and are in sinus rhythm with a heart rate > 70 bpm.
- Consider assessing people with CHF for biventricular pacemakers and implantable defibrillators.

## Definitions

### Chronic heart failure

A complex clinical syndrome that is frequently, but not exclusively, characterised by an underlying structural abnormality or cardiac dysfunction that impairs the ability of the left ventricle (LV) to fill with or eject blood, particularly during physical activity. Symptoms of CHF (e.g. dyspnoea and fatigue) can occur at rest or during physical activity (see Table 1 on page four).

### Systolic heart failure

A weakened ability of the heart to contract. The most common form of CHF.

### Heart failure with preserved systolic function (HFPSF)

Also known as 'diastolic heart failure'.

Impaired filling of the LV of the heart in response to a volume load, despite normal ventricular contraction. Systolic heart failure and HFPSF can occur together. The distinction between them is relevant to the therapeutic approach (see Table 3 on page six).

## Gaps in current management

Australian studies show that the care of people with CHF could be improved by:

- greater use of echocardiography – currently under-used in diagnosis and ongoing assessment
- greater use of ACEIs – currently under-prescribed and used at suboptimal doses
- greater use of beta-blockers – currently under-prescribed and used at suboptimal doses
- avoidance of drugs that may exacerbate CHF – inadvertent co-prescribing is common.

## Who is at risk?

CHF is a disabling and potentially fatal condition affecting an estimated 1.5–2% of Australians. It is one of the most common reasons for hospital admission and GP consultations in the elderly. Prevalence is rising, but a significant proportion of people with CHF remain undiagnosed.

Systolic heart failure is mainly due to coronary heart disease (CHD). HFPSF is more common in women and the elderly, and is mainly due to hypertension, age-related fibrosis and hypertrophy, CHD and diabetes.

## Diagnosis of CHF

### Causes of CHF

#### Common

- CHD
- Conditions that cause pressure overload (e.g. hypertension, aortic stenosis)
- Idiopathic dilated cardiomyopathy

#### Less common

- Volume overload (e.g. mitral valve regurgitation)
- Uncontrolled arrhythmias (e.g. atrial fibrillation (AF))
- Thyroid dysfunction (e.g. hyperthyroidism, hypothyroidism)
- Other systemic illness (e.g. amyloidosis, sarcoidosis, scleroderma, haemochromatosis, cryoglobulinaemia)
- Idiopathic

Early diagnosis of LV dysfunction is the goal, because optimal treatment can prevent or slow CHF progression.

Diagnosis is based on clinical features, chest X-ray (acute phase) and echocardiography (or plasma BNP measurement if the echocardiogram can't be performed in a timely manner and the diagnosis is not clear) (see Figure 1 on fold out panel).

Other tests and response to treatment help confirm the diagnosis, determine prognosis and guide management (see Table 2 on page five).

Try to distinguish systolic heart failure from HFPSF (see Table 3 on page six).

## When to suspect CHF

Most symptoms of CHF are non-specific. Consider investigating for possible CHF in:

- people with unexplained fatigue, dyspnoea or symptoms of fluid overload, with or without risk factors
- people with risk factors, including previous myocardial infarction (MI) or hypertension (particularly in the elderly).

## History, examination and investigations

Symptoms that are relatively specific to CHF (e.g. orthopnoea, paroxysmal nocturnal dyspnoea or ankle oedema) occur in more advanced disease and do not help early diagnosis.

Exertional dyspnoea is usually present and may be slowly progressive. A dry, irritating cough (especially at night), dizziness or palpitations can also suggest CHF.

Examination should include assessment of vital signs, cardiac auscultation (murmurs, S3 gallop) and checking for signs of fluid retention (e.g. raised jugular venous pressure, peripheral oedema, basal inspiratory crepitations).

Physical examination is often normal, and clinical diagnosis of CHF can be unreliable, especially in older people and people who are obese or have concomitant pulmonary disease.

Clinical assessment can't rule out a diagnosis of CHF. People with a low LV ejection fraction (LVEF) may be asymptomatic. Absence of clinical signs of fluid overload (e.g. clear lung fields) or a normal chest X-ray do not rule out the possibility of CHF.

**Objective assessment of ventricular function using echocardiogram is necessary when CHF is suspected, because physical signs are often normal in early CHF.**

Further investigations in CHF aim to confirm the diagnosis, determine the mechanism (e.g. LV systolic dysfunction, valvular heart disease), determine the cause (e.g. CHD), identify exacerbating and precipitating factors (e.g. arrhythmias, ischaemia, anaemia, pulmonary embolism, infection), guide treatment and determine prognosis.

Everyone with suspected CHF should undergo an ECG, chest X-ray and echocardiogram, even if physical signs are normal (see Table 2 on page five).

#### Echocardiogram

Echocardiography is the single most useful diagnostic test in the evaluation of people with suspected CHF.

The echocardiogram (structural assessment combined with Doppler flow studies) provides information on LV and right ventricular size, volume and wall thickness; ventricular systolic and diastolic function; and valvular structure and function.

The echocardiography report should help you decide:

- if the person's symptoms and signs can be attributed to CHF
- the severity of CHF
- the probable cause of CHF (e.g. CHD, hypertension, valvular disease, myocardial damage)
- an appropriate management plan.

**Table 1.** New York Heart Association (NYHA) functional classification of CHF symptoms

<b>NYHA I</b>	No symptoms, even during moderate-intensity physical activity.
<b>NHYA II</b>	Reduced physical capacity for moderate-intensity physical activity (e.g. breathlessness when climbing stairs).
<b>NHYA III</b>	Severely reduced physical capacity for low-intensity physical activity (e.g. breathlessness except when at rest).
<b>NHYA IV</b>	Symptomatic at rest.

**Table 2.** Investigations in CHF

#### Investigations indicated in people with suspected CHF

##### Echocardiogram

- The most useful test.
- Provides objective assessment of cardiac structure and function, and confirms the diagnosis of systolic LV dysfunction.

##### ECG

- Can add or confirm information about the cause of CHF (e.g. MI).
- Changes on ECG are not specific to heart failure, so an abnormal ECG does not replace echocardiography.

##### Chest X-ray

- Specific abnormalities can rule out CHF as an explanation for the person's symptoms and signs.
- Cardiomegaly, pulmonary venous changes and interstitial oedema of lung fields support the diagnosis of CHF.
- Normal chest X-ray does not exclude CHF.

##### Full blood count, plasma urea, creatinine and electrolytes

- Include these in diagnostic investigation and repeat every six months in people with stable CHF.
- Mild anaemia is common in CHF and worsens prognosis. Severe anaemia is occasionally a cause. All anaemia warrants full investigation.

#### Other investigations

- **Thyroid function tests** are indicated when thyroid dysfunction is considered as a possible cause of CHF (e.g. older people with AF and no pre-existing CHD).
- **Liver function tests** are abnormal if congestive hepatomegaly and/or cardiac cirrhosis are present.
- **Plasma BNP** may be helpful to improve diagnostic accuracy in people with recent-onset dyspnoea by ruling out CHF.
- **Stress testing** may be indicated to exclude ischaemia as a cause of CHF if exertional dyspnoea is not explained by resting echocardiography. The test protocol should be determined in consultation with a cardiologist, if possible.
- **Coronary angiography** (as indicated by stress test and to assess for myocardial revascularisation) should be considered in people with CHF with a history of exertional angina or suspected ischaemic LV dysfunction.
- **Invasive haemodynamic testing** is occasionally useful when the diagnosis of CHF is in doubt, or to confirm HFPSF.
- **Endomyocardial biopsy** is rarely indicated (e.g. with dilated cardiomyopathy or recent onset, or when CHD has been excluded by angiography).
- **Spirometry** is useful in excluding respiratory disease (e.g. chronic obstructive pulmonary disease (COPD), asthma).

**Table 3.** Systolic heart failure and HFPSF

	Systolic heart failure	HFPSF
<b>Diagnosis</b> Clinical signs and symptoms of CHF (e.g. history, symptoms, signs, chest X-ray).	Echocardiography: impaired LV contractile function (LVEF < 40%).	Echocardiography: impaired LV relaxation and/or evidence of raised filling pressure and normal LV function (LVEF > 40%).  Exclude myocardial ischaemia and valvular disease.  Cardiac catheterisation or echocardiography may indicate diastolic dysfunction.
<b>Relevance to management</b>	Strong evidence supports standard treatments (see Table 4 on page 10).  Prognosis worsens as functional class progresses.	Occurs in 40% of people with CHF.  Recognised as a significant clinical entity, but remains difficult to diagnose.  Manage underlying cause (e.g. strict control of blood pressure (BP) and blood glucose). Use ACEIs or angiotensin II receptor blockers (ARB) to prevent LV hypertrophy.

## Management of CHF

### Management goals

The goals of therapy are to:

- prevent CHF in people at risk
- detect asymptomatic LV dysfunction early
- relieve symptoms and improve quality of life
- slow disease progress and prolong survival
- improve physical activity tolerance
- reduce hospital admissions.

### Prevent CHF in people at risk

- Prescribe an ACEI in people with asymptomatic systolic LV dysfunction as tolerated (see Figure 2 on fold out panel), and consider preventive ACEI therapy in people most at risk (e.g. with a history of MI or other cardiovascular disease).
- Prescribe one or more antihypertensive agents to prevent CHF in people with hypertension.
- Initiate treatment with a beta-blocker early after MI, whether or not the person has systolic ventricular dysfunction.
- Manage lipid abnormalities using statin therapy according to Heart Foundation guidelines.

### Identify high-risk people for extra care

Up to two-thirds of CHF-related hospital admissions could be avoided by improved adherence to therapy, adequate access to medical and social support for people with CHF and their carers, and appropriate response to acute exacerbations or signs of deterioration.

The most practical indicator of increased risk of premature morbidity and mortality, or of readmission to hospital, is the presence of two or more of the following:

- age > 65 years
- severe symptoms limiting activities of daily living
- LVEF < 30%
- living alone or remotely from specialist cardiac services
- depression
- significant renal dysfunction

- increasing frailty and debilitation
- language barrier
- lower socioeconomic status.

### Routinely instigate non-pharmacological treatment in people with CHF

Strong evidence supports the routine instigation of non-pharmacological measures as a central component of CHF management.

### Educate people with CHF about self-management

Teach people with CHF to monitor and control their fluid balance.

- Limit dietary sodium to less than 2 g/day, and fluid intake to < 2 L/day (1.5 L for severe CHF), although this will depend on individual circumstances. Limit caffeine to 1–2 drinks per day.
- Use the person's weight after correction of fluid overload as a benchmark. Explain that steady weight gain over days may indicate fluid retention. Instruct people to weigh themselves each morning (after urinating and before dressing and breakfast), and to contact a doctor or specialist heart failure nurse immediately if there is a 2 kg gain or loss over 48 hours.
- Explain symptoms of dyspnoea, oedema and bloating, and advise people to report these symptoms if detected.
- Some people can learn to self-adjust diuretics (e.g. double the dose if there is evidence of retention).

Advise people with CHF about healthy lifestyle and prevention strategies.

- Minimise alcohol intake: should not exceed one to two standard drinks per day. Patients who have alcohol-related cardiomyopathy should not consume alcohol to help slow their disease's progression.
- Quit smoking.
- Vaccinate against influenza and pneumococcal disease.
- Bed rest when clinically unstable or during an acute exacerbation.

For more information and advice about self-management, refer people with CHF to the Heart Foundation's Health Information Service, phone **1300 36 27 87** (local call cost) or email [health@heartfoundation.com.au](mailto:health@heartfoundation.com.au).

## Refer people with CHF to a physical activity specialist

Regular physical activity reduces symptoms and increases functional capacity in people with CHF. It is also recommended to correct physical de-conditioning.

People with CHF should be referred to a physical activity specialist for a specially designed physical activity program, if available. The benefits are greater for middle-aged people with systolic heart failure.

For more information, see the *Physical activity recommendations for people with cardiovascular disease 2006*.

## Access multidisciplinary CHF programs where available

Most people with CHF need complex management due to increased age, comorbidities, polypharmacy, depression or reduced coping skills.

Nurse-led multidisciplinary CHF programs are available throughout Australia. They offer evidence-based pharmacological and non-pharmacological therapy. Programs usually include personalised care; self-care education for people with CHF and their carers; counselling; intensive follow-up to detect problems early and prevent deterioration; physical activity programs; and access to advice and support.

These programs can significantly reduce the risk of re-hospitalisation, improve quality of life, reduce healthcare costs and prolong survival.

## Treat for co-existing sleep apnoea

Sleep disordered breathing commonly occurs with CHF. Consider referring people with CHF to a sleep clinician if there is excessive daytime drowsiness or a history of snoring. Nasal continuous positive airway pressure (CPAP) may be indicated.

\* Unless contraindicated or not tolerated.

## Systolic heart failure: initiate pharmacological treatment to prolong survival

Prescribe an ACEI\* for people with systolic heart failure (LVEF < 40%), whether symptoms are mild, moderate or severe. Titrate to recommended dose for maximum benefit, as tolerated. An ARA is an alternative in people who are unable to tolerate ACEIs.

Prescribe a loop diuretic to manage symptoms of fluid overload. In people with systolic LV dysfunction, diuretics should never be used as monotherapy, but should always be combined with an ACEI\*.

Beta-blockers\* (carvedilol, bisoprolol, extended-release metoprolol, nebivolol) are recommended for people with systolic heart failure, in addition to ACEI\* at an effective dose. Titrate to the highest recommended dose tolerated.

Spironolactone\* is recommended for people with systolic heart failure with severe symptoms (NYHA Class III-IV), despite an appropriate dose of ACEIs\* and diuretics. Eplerenone should be considered in people with systolic heart failure who still have mild (NYHA Class II) symptoms, despite receiving standard therapies with ACEIs and beta-blockers.

Use diuretics, digoxin and nitrates to manage symptoms as indicated in people already receiving ACEIs and beta-blockers.

Fish oils should be considered as a second-line treatment for people with CHF who still have symptoms despite standard therapy with ACEIs, ARBs and beta-blockers, if tolerated.

Direct sinus node inhibition with ivabradine should be considered for people with CHF who have impaired systolic function and a recent heart failure hospitalisation, and who are in sinus rhythm with a heartbeat > 70 bpm.

Iron deficiency should be looked for and treated in people with CHF to improve symptoms, exercise tolerance and quality of life.

Table 4 on page 10 lists other main pharmacological management options.

## Consider Chronic Disease Management (CDM) Medicare items

People with CHF who need multidisciplinary care may benefit from:

- a GP Management Plan (Item 721) and subsequent review (Item 725)
- Team Care Arrangements coordinated by the GP (Item 723) and subsequent review (Item 727).

An effective multidisciplinary team might include an exercise physiologist and a dietitian.

## HFPSF: manage risk of progression

There is limited clinical evidence to guide the management of HFPSF. Aims are to:

- manage the underlying cause (strict BP control in hypertension, strict glycaemic and low BP targets in diabetes)
- prevent LV hypertrophy (initiate ACEI or ARA therapy\* as for systolic heart failure).

## Manage related and coexisting conditions

Use digoxin to control the ventricular rate of AF, and beta-blockers if heart failure is stabilised. Amiodarone may also be considered to control AF or ventricular fibrillation (VF). Follow guidelines for preventive use of warfarin<sup>†</sup> in AF.

For people with CHD, prescribe low-dose aspirin and a statin to achieve recommended lipid targets (LDL-C < 2.0 mmol/L, HDL-C > 1.0 mmol/L and TG < 2 mmol/L). Arrange assessment for coronary revascularisation as appropriate after initiation of optimal drug therapy.

Achieve BP targets in people with hypertension using a combination of antihypertensive agents. A dihydropyridine calcium-channel blocker (amlodipine or felodipine) may be added to ACEI and beta-blocker if required.

Cardiac surgery may benefit people with valvular damage or symptomatic coronary disease.

\* Unless contraindicated or not tolerated.

† An anticoagulant that does not require INR control will be available for non-valve-related AF, but its role in comparison with warfarin is not yet established in CHF-only populations.

## Avoid drugs that exacerbate CHF

- Anti-arrhythmic agents (other than beta-blockers and amiodarone)
- Non-dihydropyridine calcium-channel blockers (e.g. verapamil, diltiazem)
- Tricyclic antidepressants
- Non-steroidal anti-inflammatory drugs (including COX-2 inhibitors)
- Clozapine
- Thiazolidinediones (e.g. pioglitazone, rosiglitazone)
- Corticosteroids (e.g. glucocorticoids, mineralocorticoids)
- Tumour necrosis factor antagonists
- Dronedarone (associated with increased mortality in people with NYHA Class IV CHF or NYHA Class II-III CHF with a recent decompensation requiring hospitalisation, and is contraindicated in such people)
- Trastuzumab (associated with the development of reduced LVEF and heart failure. It is contraindicated in people with symptomatic heart failure or reduced LVEF (< 45%). Baseline and periodic evaluation of cardiac status, including assessment of LVEF should occur)
- Tyrosine kinase inhibitors (e.g. sunitinib). Associated with hypertension, reduced LVEF and heart failure. The risk-benefit profile needs to be considered with these agents in people with a history of symptomatic heart failure or cardiac disease. Baseline and periodic evaluation of LVEF should be considered, especially in the presence of cardiac risk factors)
- Moxonidine (associated with increased mortality in people with heart failure and is contraindicated in such people)

**Table 4.** Pharmacological treatment for CHF

Agents	Recommendations	Prescribing notes
<b>ACEIs</b>	Mandatory in people with systolic LV dysfunction.  Prolong survival, improve symptoms and reduce hospitalisation in symptomatic people.	Prescribe once daily at night.  Titrate over 3–4 weeks to highest recommended dose tolerated. Monitor potassium and renal function.
<b>Loop diuretics</b>	Use to manage symptoms of fluid overload in addition to ACEI.  Improve exercise tolerance, cardiac function and symptoms of fluid overload.	Titrate according to fluid balance, judged by bodyweight change and symptoms.  With appropriate training, people with CHF can adjust their own dose.
<b>Beta-blockers</b>	Recommended in all grades of systolic CHF in combination with an ACEI.  Prolong survival and normalise LV function (e.g. carvedilol, bisoprolol, extended-release metoprolol, nebivolol).	Start when symptoms improve and are stable for $\geq 1$ week. Start at low dose and titrate slowly to recommended dose if tolerated. Warn people of possibility of transient tiredness.  Use with caution in people with reversible broncho-constriction (asthma).
<b>ARAs</b>	Alternative to ACEIs in people who can't tolerate ACEIs (e.g. cough).	Not recommended in preference to ACEIs.
<b>Spirolactone</b>	Recommended for people with systolic CHF with severe symptoms (NYHA Class III-IV), despite appropriate doses of ACEIs and diuretics.	Not recommended if glomerular filtration rate (GFR) $< 30$ mL/min.  Monitor potassium and renal function regularly, especially in the elderly.
<b>Eplerenone</b>	Recommended early post-MI for people with LV systolic dysfunction and symptoms of heart failure.  Recommended in people with systolic heart failure who still have mild (NYHA Class II) symptoms despite receiving standard therapies with ACEIs and beta-blockers.	Not recommended if GFR $< 30$ mL/min.  Monitor potassium and renal function regularly, especially in the elderly.

Agents	Recommendations	Prescribing notes
<b>Digoxin</b>	Consider for relief of symptoms in people with advanced CHF and people with AF.  Improves exercise capacity and reduces risk of hospitalisation.	Low dose (62.5 $\mu\text{g/day}$ ). Adjust for renal impairment or concomitant use of amiodarone.  Monitor clinical effect and toxicity (routine blood level monitoring no longer recommended).
<b>Direct sinus node inhibition with ivabradine</b>	Consider in people with CHF who have impaired systolic function and a recent heart failure hospitalisation, and who are in sinus rhythm where their heartbeat remains $\geq 70$ bpm, despite efforts to maximise dose of background beta blockade.	
<b>Nitrates</b>	Recommended in angina prophylaxis.  Reserve hydralazine–nitrate combination for people who can't take ACEIs or ARAs.	Start with a low dose and increase to target over 1–2 weeks.
<b>Fish oil (n-3 polyunsaturated fatty acids)</b>	Consider as second-line agent in people with CHF who remain symptomatic despite receiving standard therapies with ACEIs and beta-blockers.	
<b>Iron</b>	Consider in people with CHF who are iron deficient.	

## Some common causes of deterioration in people with previously stable CHF

- Ischaemia
- Arrhythmias (most commonly AF)
- Valvular dysfunction
- Poor compliance with medicines (e.g. cessation of diuretics)
- Unrestricted salt and water intake
- Use of medicines that worsen CHF
- Infections
- Renal failure
- Anaemia
- Pulmonary embolus
- Thyroid dysfunction

## Devices

Biventricular pacing is emerging as a safe and effective treatment to improve symptoms and haemodynamics in people with CHF. It should be considered (with or without an implantable cardioverter defibrillator (ICD)) in people with all of the following:

- NYHA functional class III–IV on treatment (see Table 1 on page four)
- heart failure with LVEF  $\leq$  35%
- QRS interval duration  $\geq$  120 ms
- sinus rhythm.

ICD implantation should be considered in people with CHF who meet any of the following criteria:

- history of cardiac arrest due to VF or ventricular tachycardia (VT)
- spontaneous sustained VT in association with structural CHD
- LVEF  $\leq$  30% when stabilised post MI or revascularisation
- NYHA functional class II–III, LVEF  $\leq$  35%.

In people in whom implantation of an ICD is planned to reduce the risk of sudden death, it is reasonable to also consider cardiac resynchronisation therapy (CRT) to reduce risk of death and heart failure events if the LVEF is  $\leq$  30% and the QRS duration is  $\geq$  150 ms (left bundle branch block morphology), with associated mild symptoms (NYHA Class II), despite optimal medical therapy.

LV assist devices are used mainly as temporary bridges to cardiac transplantation or recovery after heart surgery.

## Manage advanced and end-stage CHF

The use of positive inotropes for short-term improvement of cardiac pumping action is reserved for people not responding to other treatments. Levosimendan or dobutamine may be of benefit in people with advanced CHF. In people who can't be weaned off continuous inpatient infusion, consider continuous ambulatory infusion at home.

Both continuous positive airway pressure (CPAP) and bi-level positive airway pressure (BiPAP) ventilation reduce the need for invasive ventilation in people with acute pulmonary oedema.

Palliative care should be considered for people who are likely to die within 12 months and have poor quality of life on standard therapy aimed to prolong life. Strong predictors of death within months include advanced age, recurrent hospitalisation for decompensated heart failure or related diagnosis, NYHA class IV symptoms, severe renal impairment, cardiac cachexia, low plasma sodium concentration and refractory hypotension that necessitates withdrawal of medical therapy.

It may be useful to consider the formulation of advanced care directives and referral to specialist palliative care services where symptom management is challenging.

## When to refer people with CHF

Referral to specialist care has been shown to improve outcomes, reduce hospitalisation and improve symptoms in people with CHF.

- GPs are ideally placed to coordinate ongoing care for people with CHF.
- Referral to a specialist may be warranted when:
  - the diagnosis is uncertain
  - complex management (including co-morbidities) is needed
  - acute decompensation occurs
  - help is needed to clarify the prognosis
  - revascularisation, implantation of devices or heart and/or lung transplantation are being considered
  - the person is young (e.g.  $<$  65 years of age).

## More information

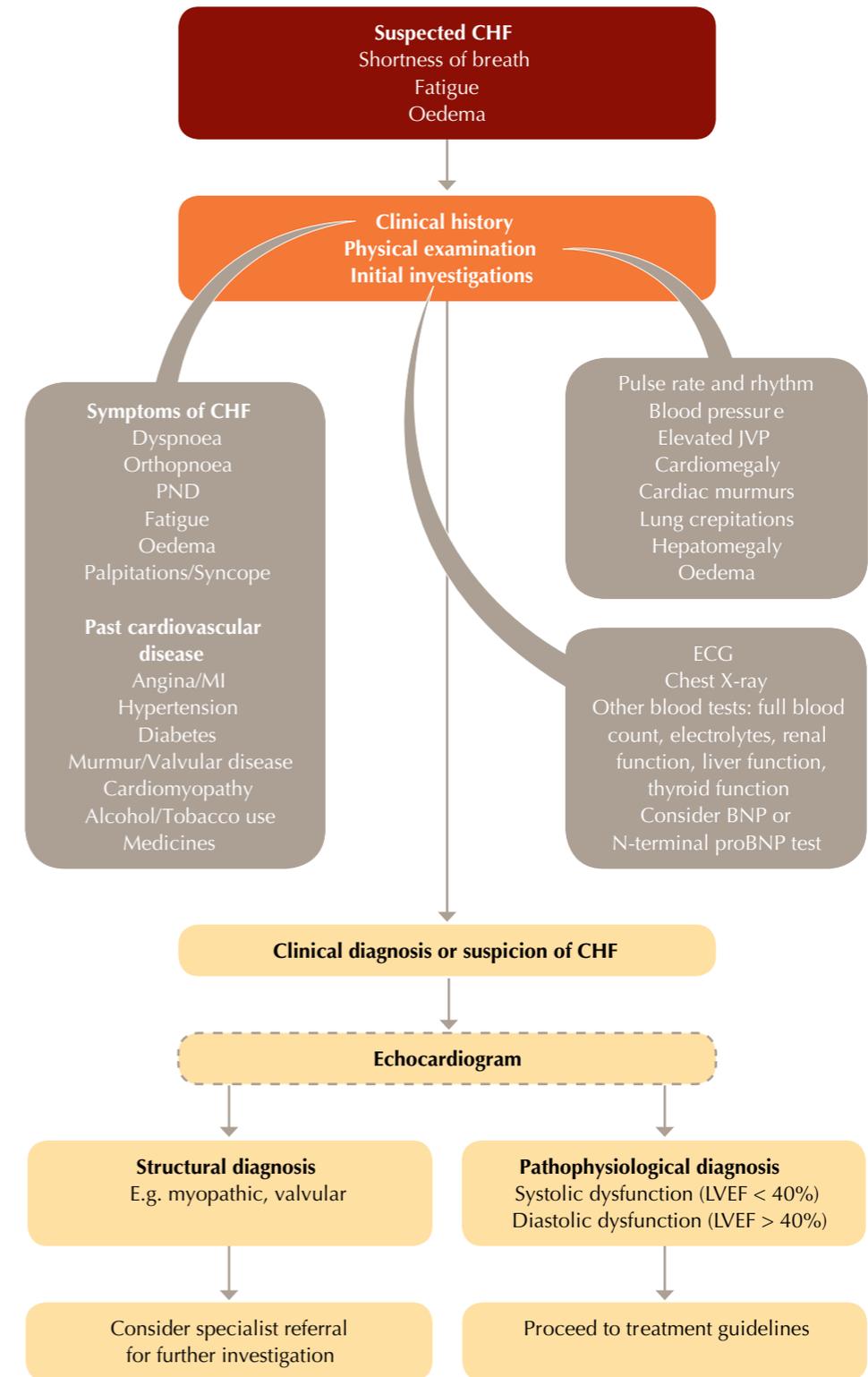
- **Guidelines for the prevention, detection and management of chronic heart failure in Australia. Updated October 2011** The full evidence-based review from which this quick reference guide is derived. Provides detailed information on the prevention, diagnosis and management of CHF, including levels of evidence and grades of recommendations. Available in print and online at [www.heartfoundation.org.au](http://www.heartfoundation.org.au).
- **2011 Update to Guidelines for the prevention, detection and management of chronic heart failure in Australia, 2006** A *Medical Journal of Australia* article, available online at [www.mja.com.au](http://www.mja.com.au).
- **Multidisciplinary care for people with chronic heart failure. Principles and recommendations for best practice** Available in print and online at [www.heartfoundation.org.au](http://www.heartfoundation.org.au).
- **Living well with chronic heart failure** Patient and carer booklet with action plan insert. Available in print only. Information sheet summary available in print and online at [www.heartfoundation.org.au](http://www.heartfoundation.org.au).

- **Living every day with my heart failure** Aboriginal and Torres Strait Islander patient and carer booklet, with action plan, available in print only.
- For general information and to order a print copy of the Heart Foundation resources, call our Health Information Service on **1300 36 27 87** or email [health@heartfoundation.com.au](mailto:health@heartfoundation.com.au).



Please fold out for diagnosis and treatment algorithms

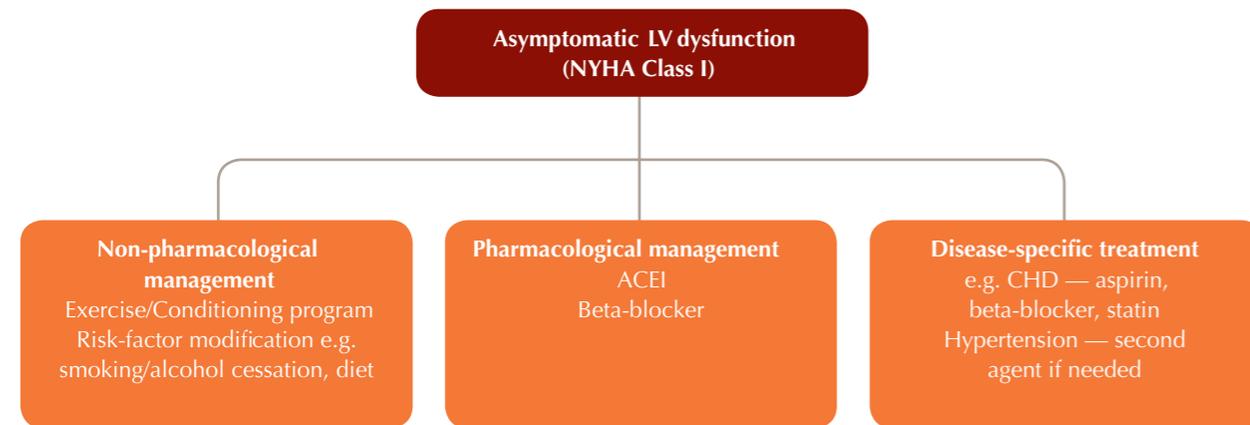
Figure 1 Diagnostic algorithm for CHF



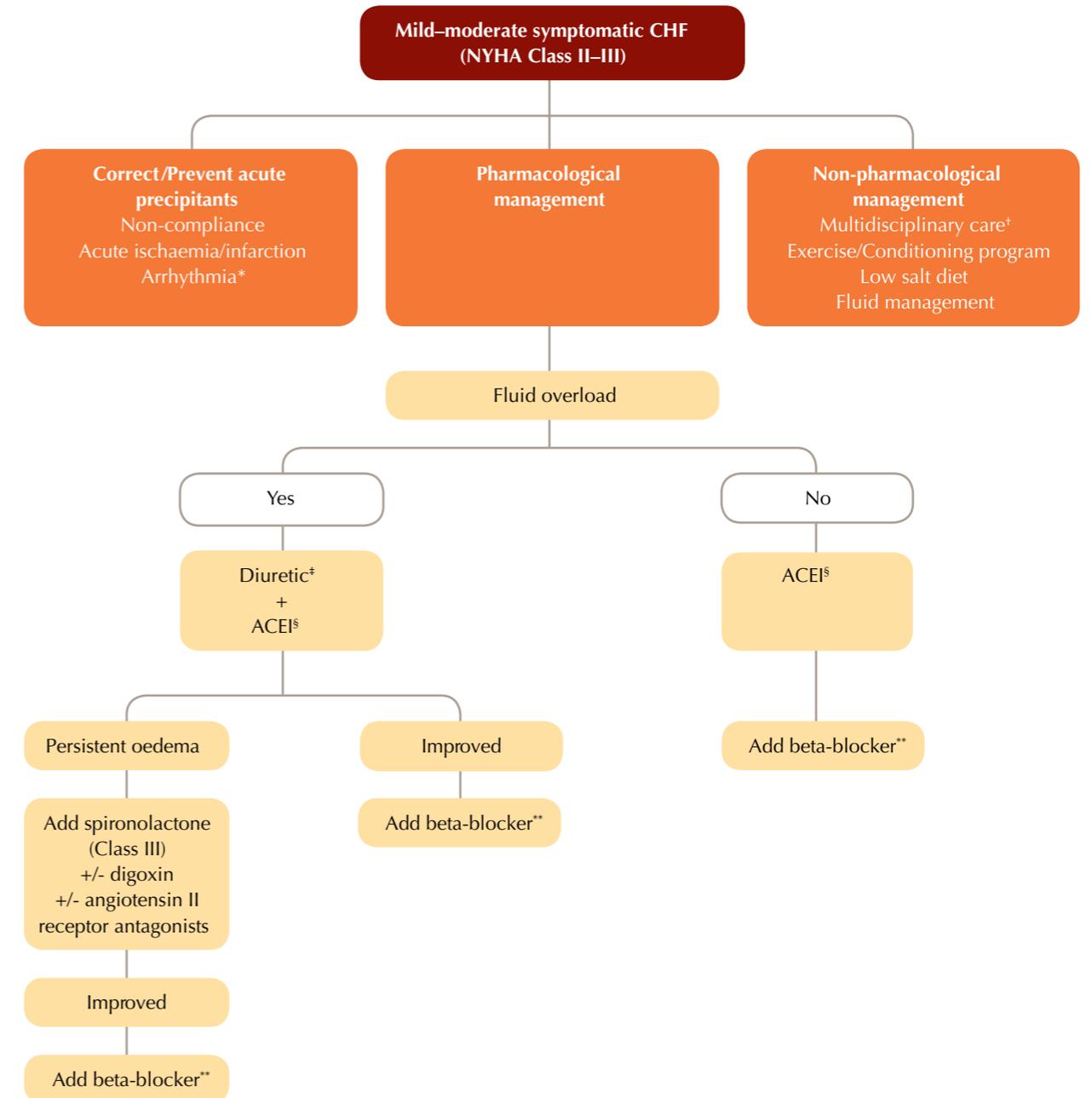
BNP = B-type natriuretic peptide.  
JVP = jugular venous pressure.  
LVEF = left ventricular ejection fraction.

MI = myocardial infarction.  
PND = paroxysmal nocturnal dyspnoea.

**Figure 2** Pharmacological treatment of asymptomatic LV dysfunction (LVEF < 40%) (NYHA Class I)



**Figure 3** Pharmacological treatment of systolic heart failure (LVEF < 40%) (NYHA Class II/III)



\* Patients in AF should be anticoagulated with a target INR of 2.0–3.0. Amiodarone may be used to control AF rate or attempt cardioversion. Electrical cardioversion may be considered after 4 weeks if still in AF. Digoxin will slow resting AF rate.

† Multidisciplinary care (pre-discharge and home review by a community care nurse, pharmacist and allied health personnel) with education regarding prognosis, compliance, exercise and rehabilitation, lifestyle modification, vaccinations and self-monitoring.

‡ The most commonly prescribed first-choice diuretic is a loop diuretic e.g. frusemide; however there is no evidence that loop diuretics are more effective or safer than thiazides.

§ If ACEI intolerant, use angiotensin II receptor antagonists instead.

\*\* Once the patient is stable, prescribe beta-blockers that have been shown to improve outcomes in heart failure: carvedilol (beta-1, beta-2 and alpha-1 antagonist), bisoprolol (beta-1 selective antagonist), metoprolol extended release (beta-1 selective antagonist) or nebivolol (selective beta-1 receptor antagonist).



For heart health information  
1300 36 27 87  
[www.heartfoundation.org.au](http://www.heartfoundation.org.au)

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