NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Chronic heart failure in adults: diagnosis and management

NICE guideline: short version

Draft for consultation, March 2018

This guideline covers diagnosing and managing chronic heart failure in people aged 18 and over. It aims to improve diagnosis and treatment to increase the length and quality of life for people with heart failure.

Who is it for?

- Healthcare professionals
- People with heart failure, their families and carers

This guideline will update and replace NICE guideline CG108 (published August 2010). You are invited to comment on the new and updated recommendations in this guideline. These are marked as **[2018]** if the evidence has been reviewed.

You are also invited to comment on recommendations that NICE proposes to delete from the 2010 guideline.

We have not updated recommendations shaded in grey, and cannot accept comments on them. In some cases, we have made minor wording changes for clarification.

See update information for a full explanation of what is being updated.

This version of the guideline contains the draft recommendations, context and recommendations for research. Information about how the guideline was developed is on the guideline's page on the NICE. This includes the guideline committee's discussion and the evidence reviews (in the full guideline), the scope, and details of the committee and any declarations of interest.

The supporting information and evidence for the 2018 recommendations is contained in the full version of the 2018 guideline. Evidence for the 2010 and 2003 recommendations is on the 2010 guideline page.

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1 Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

1.1 Role of the specialist heart failure multidisciplinary team

1.1.1 The core specialist heart failure multidisciplinary team (MDT) should include:

- a physician with a subspecialty interest in heart failure
- a specialist heart failure nurse
- a healthcare professional with expertise in specialist prescribing for heart failure
- the primary care team. **[2018]**

1.1.2 The specialist heart failure MDT should directly involve, or refer people to, other services, including rehabilitation services, and tertiary and palliative care, as needed. **[2018]**

1.1.3 The specialist heart failure MDT should:

- diagnose heart failure
- give information to people newly diagnosed with heart failure (see giving information to people with heart failure)
- manage newly diagnosed, recently decompensated or advanced (NYHA [New York Heart Association] class III to IV) heart failure
- optimise treatment
- start new medicines that need specialist supervision

- manage care after an interventional procedure such as implantation of a cardioverter defibrillator, cardiac resynchronisation device or left ventricular assist device, or cardiac transplantation
- manage heart failure that is not responding to treatment. **[2018]**

1.1.4 The primary care team, as part of the specialist heart failure MDT, should carry out the following for people with heart failure at all times, including periods when the person is also receiving specialist heart failure care from the MDT:

- ensure effective communication links between different care settings and clinical services involved in the person's care
- lead a full review of the person's heart failure care, which may form part of a long-term conditions review
- recall the person at least every 6 months and update the summary and care plan (see writing a care plan)
- ensure that changes to the care plan are understood and agreed by the person with heart failure and shared with the specialist heart failure MDT
- arrange access to specialist heart failure services if needed. **[2018]**

Care after an acute event

For recommendations on the diagnosis and management of acute heart failure see NICE's guideline on acute heart failure.

1.1.5 People with heart failure should generally be discharged from hospital only when their clinical condition is stable and the management plan is optimised. Timing of discharge should take into account the wishes of the person and their family or carer, and the level of care and support that can be provided in the community. **[2003]**

1.1.6 The primary care team working within the specialist heart failure MDT should take over routine management of heart failure as soon as it has been stabilised and its management optimised. **[2018]**

Writing a care plan

1.1.7 The specialist heart failure MDT should write a summary for each person with heart failure that includes:

- diagnosis and aetiology
- medicines prescribed, monitoring of medicines, when medicines should be reviewed and any support the person needs to take the medicines
- functional abilities and any social care needs
- social circumstances, including carers' needs. **[2018]**

1.1.8 The summary should form the basis of a care plan for each person, which should include:

- plans for managing the person's heart failure, including follow-up care, rehabilitation and access to social care
- symptoms to look out for in case of deterioration
- a process for any subsequent access to the specialist heart failure MDT if needed
- contact details for
  - a named healthcare coordinator (usually a specialist heart failure nurse)
  - alternative local heart failure specialist care providers, for urgent care or review.
- additional sources of information for people with heart failure. **[2018]**

1.1.9 Give a copy of the care plan to the person with heart failure, their family or carer if appropriate, and all health and social care professionals involved in their care. **[2018]**

1.2 Diagnosing heart failure

Symptoms, signs and investigations

1.2.1 Take a careful and detailed history, and perform a clinical examination and tests to confirm the presence of heart failure. **[2010]**

1.2.2 Measure N-terminal pro-B-type natriuretic peptide (NT-proBNP) in people with suspected heart failure. **[2018]**

1.2.3 Because very high levels of NT-proBNP carry a poor prognosis, refer people with suspected heart failure and an NT-proBNP level above 2,000 pg/ml (236 pmol/litre) urgently, to have transthoracic doppler 2D echocardiography and specialist assessment within 2 weeks. **[2018]**

1.2.4 Refer people with suspected heart failure and an NT-proBNP level between 400 and 2,000 pg/ml (47 to 236 pmol/litre) to have transthoracic doppler 2D echocardiography and specialist assessment within 6 weeks. **[2018]**

1.2.5 Be aware that:

- an NT-proBNP level less than 400 pg/ml (47 pmol/litre) in an untreated person makes a diagnosis of heart failure unlikely
- the level of serum natriuretic peptide does not differentiate between heart failure with reduced ejection fraction and heart failure with preserved ejection fraction. **[2018]**

1.2.6 Review alternative causes for symptoms of heart failure in people with NT-proBNP levels below 400 pg/ml. If there is still concern that the symptoms might be related to heart failure, discuss with a physician with a subspeciality interest in heart failure. **[2018]**

1.2.7 Be aware that:

- obesity, African or African-Caribbean family origin, or treatment with diuretics, angiotensin-converting enzyme (ACE) inhibitors, beta-blockers, angiotensin II receptor antagonists (ARBs) or mineralocorticcoid receptor antagonists (MRAs) can reduce levels of serum natriuretic peptides
- high levels of serum natriuretic peptides can have causes other than heart failure (for example, age over 70 years, left ventricular hypertrophy, ischaemia, tachycardia, right ventricular overload,

hypoxaemia [including pulmonary embolism], renal dysfunction [eGFR less than 60 ml/minute/1.73 m^2], sepsis, chronic obstructive pulmonary disease, diabetes, or cirrhosis of the liver). **[2010, amended 2018]**

1.2.8 Perform transthoracic doppler 2D echocardiography to exclude important valve disease, assess the systolic (and diastolic) function of the (left) ventricle, and detect intracardiac shunts. **[2003]**

1.2.9 Transthoracic doppler 2D echocardiography should be performed on high-resolution equipment, by experienced operators trained to the relevant professional standards. Need and demand for these studies should not compromise quality. **[2003]**

1.2.10 Ensure that those reporting echocardiography are experienced in doing so. **[2003]**

1.2.11 Consider alternative methods of imaging the heart (for example, radionuclide angiography [multigated acquisition scanning], cardiac MRI or transoesophageal doppler 2D echocardiography) if a poor image is produced by transthoracic doppler 2D echocardiography. **[2003, amended 2018]**

1.2.12 Perform an ECG and consider the following tests to evaluate possible aggravating factors and/or alternative diagnoses:

- chest X-ray
- blood tests:
  - electrolytes, and creatinine including eGFR (estimated glomerular filtration rate)
  - thyroid function tests
  - liver function tests
  - lipid measurement
  - glycosylated haemoglobin (HbA_{1c})
  - full blood count
- urinalysis
- peak flow or spirometry. **[2010, amended 2018]**

1.2.13 Try to exclude other disorders that may present in a similar manner, such as pulmonary fibrosis. **[2003, amended 2018]**

1.2.14 When a diagnosis of heart failure has been made, assess severity, aetiology, precipitating factors, type of cardiac dysfunction and correctable causes. **[2010]**

Heart failure caused by valve disease

1.2.15 Refer people with heart failure caused by valve disease for specialist assessment and advice regarding follow-up. **[2003]**

Reviewing existing diagnoses

1.2.16 Review the basis for a historical diagnosis of heart failure, and manage care in accordance with this guideline only if the diagnosis is confirmed. **[2003]**

1.2.17 If the diagnosis of heart failure is still suspected, but confirmation of the underlying cardiac abnormality has not occurred, then the person should have appropriate further investigation. **[2003]**

1.3 Giving information to people with heart failure

1.3.1 When giving information to people with heart failure, follow the recommendations in the NICE guideline on patient experience in adult NHS services. **[2018]**

1.3.2 Discuss the person's prognosis in a sensitive, open and honest manner. Be frank about the uncertainty in predicting the course of their heart failure. Revisit this discussion as the person's condition evolves. **[2018]**

1.3.3 Provide information whenever needed throughout the person's care. **[2018]**

1.3.4 Consider training in advanced communication skills for all healthcare professionals working with people who have heart failure. **[2018]**

First consultations for people newly diagnosed with heart failure

1.3.5 Offer people newly diagnosed with heart failure an extended first consultation, followed by a second consultation to take place within 2 weeks if possible. At each consultation:

- discuss the person's diagnosis and prognosis
- explain heart failure terminology
- discuss treatments
- address the risk of sudden death, including any misconceptions about that risk
- encourage the person and their family or carers to ask any questions they have. **[2018]**

1.4 Managing all types of heart failure

When managing pharmacological treatment, follow the recommendations in the NICE guidelines on medicines adherence and medicines optimisation.

Pharmacological treatment

Diuretics

1.4.1 Diuretics should be routinely used for the relief of congestive symptoms and fluid retention in people with heart failure, and titrated (up and down) according to need following the initiation of subsequent heart failure therapies. **[2003]**

1.4.2 People who have heart failure with preserved ejection fraction should usually be offered a low to medium dose of loop diuretics (for example, less than 80 mg furosemide per day). People whose heart failure does not respond to this treatment will need further specialist advice. **[2003, amended 2018]**

Calcium-channel blockers

1.4.3 Avoid verapamil, diltiazem and short-acting dihydropyridine agents in people who have heart failure with reduced ejection fraction. **[2003, amended 2018]**

Amiodarone

1.4.4 Make the decision to prescribe amiodarone in consultation with a specialist. **[2003]**

1.4.5 Review the need to continue the amiodarone prescription at the 6-monthly clinical review. **[2003, amended 2018]**

1.4.6 Offer people taking amiodarone liver and thyroid function tests, and a review of side effects, as part of their routine 6-monthly clinical review. **[2003, amended 2018]**

Anticoagulants

1.4.7 For people who have heart failure and atrial fibrillation, follow the recommendations on anticoagulation in the NICE guideline on atrial fibrillation. Be aware of the effects of anticoagulation on renal and liver function. **[2018]**

1.4.8 In people with heart failure in sinus rhythm, anticoagulation should be considered for those with a history of thromboembolism, left ventricular aneurysm or intracardiac thrombus. **[2003]**

Inotropic agents

1.4.9 Intravenous inotropic agents (such as dobutamine, milrinone or enoximone) should only be considered for the short-term treatment of acute decompensation of chronic heart failure. This will need specialist advice. **[2003]**

Vaccinations

1.4.10 Offer people with heart failure an annual vaccination against influenza. **[2003]**

1.4.11 Offer people with heart failure vaccination against pneumococcal disease (only required once). **[2003]**

Contraception and pregnancy

1.4.12 In women of childbearing potential who have heart failure, contraception and pregnancy should be discussed. If pregnancy is being considered or occurs, specialist advice should be sought. Subsequently, specialist care should be shared between the cardiologist and obstetrician. **[2003]**

Depression

See NICE's guideline on depression in adults with a chronic physical health problem.

Lifestyle advice

Salt and fluid restriction

1.4.13 Do not routinely advise people with heart failure to restrict their sodium or fluid consumption. Ask about salt and fluid consumption and, if needed, advise as follows:

- restricting fluids for people with dilutional hyponatremia
- reducing intake for people with high levels of salt and/or fluid consumption.

Continue to review the need to restrict salt or fluid. **[2018]**

1.4.14 Advise people with heart failure to avoid salt substitutes that contain potassium. **[2018]**

Smoking and alcohol

See NICE's guidance on smoking and tobacco and alcohol.

Air travel

1.4.15 Air travel will be possible for the majority of people with heart failure, depending on their clinical condition at the time of travel. **[2003]**

Driving

1.4.16 Large Goods Vehicle and Passenger Carrying Vehicle licence: physicians should be up to date with the latest Driver and Vehicle Licensing Agency guidelines. Check the website for regular updates **[2003]**

1.5 Treating heart failure with reduced ejection fraction

See section 1.7 for general recommendations on monitoring treatment for all types of heart failure.

First-line treatment

ACE inhibitors and beta-blockers

1.5.1 Offer an angiotensin-converting enzyme (ACE) inhibitor and a beta-blocker licensed for heart failure to people who have heart failure with reduced ejection fraction. Use clinical judgement when deciding which drug to start first. **[2010]**

1.5.2 Do not offer ACE inhibitor therapy if there is a clinical suspicion of haemodynamically significant valve disease until the valve disease has been assessed by a specialist. **[2003]**

1.5.3 Do not routinely offer a beta-blocker to treat heart failure with reduced ejection fraction to people who also have atrial fibrillation. Be aware that beta-blockers may be offered to these people to manage heart rate or cardiac ischaemia. **[2018]**

1.5.4 Do not withhold treatment with a beta-blocker solely because of age or the presence of peripheral vascular disease, erectile dysfunction, diabetes, interstitial pulmonary disease or chronic obstructive pulmonary disease. **[2010]**

1.5.5 Start ACE inhibitor therapy at a low dose and titrate upwards at short intervals (for example, every 2 weeks) until the target or maximum tolerated dose is reached. **[2010]**

1.5.6 Measure serum sodium, potassium, creatinine and estimated glomerular filtration rate (eGFR) before and 1 to 2 weeks after starting an ACE inhibitor, and after each dose increment. **[2010,amended 2018]**

1.5.7 Measure blood pressure before and after each dose increment of an ACE inhibitor. Follow the recommendations on measuring blood pressure,

including measurement in people with symptoms of postural hypotension, in the NICE guideline on hypertension in adults. **[2018]**

1.5.8 Once the target or maximum tolerated dose is reached, monitor treatment monthly for 3 months and then at least every 6 months, and at any time the person becomes acutely unwell. **[2010, amended 2018]**

1.5.9 Introduce beta-blockers in a 'start low, go slow' manner. Assess heart rate and clinical status after each titration. Measure blood pressure before and after each dose increment of a beta-blocker. **[2010, amended 2018]**

1.5.10 Switch people whose condition is stable and who are already taking a beta-blocker for a comorbidity (for example, angina or hypertension), and who develop heart failure with reduced ejection fraction, to a beta-blocker licensed for heart failure. **[2010]**

Alternative treatments if ACE inhibitors are not tolerated

Angiotensin II receptor blockers (ARBs)

1.5.11 Consider an angiotensin II receptor blocker (ARB) licensed for heart failure as an alternative to an ACE inhibitor for people who have heart failure with reduced ejection fraction and intolerable side effects with ACE inhibitors. **[2010]**

1.5.12 Measure serum sodium, potassium, creatinine and eGFR before and after starting an ARB and after each dose increment. **[2010, amended 2018]**

1.5.13 Measure blood pressure after each dose increment of an ARB. Follow the recommendations on measuring blood pressure, including measurement in people with symptoms of postural hypotension, in the NICE guideline on hypertension in adults. **[2018]**

1.5.14 Once the target or maximum tolerated dose is reached, monitor treatment monthly for 3 months and then at least every 6 months, and at any time the person becomes acutely unwell. **[2010, amended 2018]**

Hydralazine in combination with nitrate

1.5.15 If neither ACE inhibitors nor ARBs are tolerated, seek specialist advice and consider hydralazine in combination with nitrate for people who have heart failure with reduced ejection fraction. **[2010]**

Second-line treatment

Mineralocorticoid receptor antagonists (MRAs)

1.5.16 Offer a mineralocorticoid receptor antagonist (MRA), in addition to an ACE inhibitor (or ARB) and beta-blocker, as second-line treatment to people who have heart failure with reduced ejection fraction if they continue to have symptoms of heart failure. **[2018]**

1.5.17 Measure serum sodium, potassium, creatinine and eGFR before and after starting an MRA and after each dose increment. **[2018]**

1.5.18 Measure blood pressure before and after after each dose increment of an MRA. Follow the recommendations on measuring blood pressure, including measurement in people with symptoms of postural hypotension, in the NICE guideline on hypertension in adults. **[2018]**

1.5.19 Once the target, or maximum tolerated, dose is reached, monitor treatment monthly for 3 months and then at least every 6 months, and at any time the person becomes acutely unwell. **[2018]**

Third-line treatment

Ivabradine

These recommendations are from Ivabradine for treating chronic heart failure (NICE technology appraisal guidance 267).

1.5.20 Ivabradine is recommended as an option for treating chronic heart failure for people:

- with New York Heart Association (NYHA) class II to IV stable chronic heart failure with systolic dysfunction and

- who are in sinus rhythm with a heart rate of 75 beats per minute (bpm) or more and
- who are given ivabradine in combination with standard therapy including beta-blocker therapy, angiotensin-converting enzyme (ACE) inhibitors and aldosterone antagonists, or when beta-blocker therapy is contraindicated or not tolerated and
- with a left ventricular ejection fraction of 35% or less. **[2012]**

1.5.21 Ivabradine should only be initiated after a stabilisation period of 4 weeks on optimised standard therapy with ACE inhibitors, beta-blockers and aldosterone antagonists. **[2012]**

1.5.22 Ivabradine should be initiated by a heart failure specialist with access to a multidisciplinary heart failure team. Dose titration and monitoring should be carried out by a heart failure specialist, or in primary care by either a GP with a special interest in heart failure or a heart failure specialist nurse. **[2012]**

Sacubitril valsartan

See the recommendations in Sacubitril valsartan for treating symptomatic chronic heart failure with reduced ejection fraction (NICE technology appraisal guidance 388)[1].

Hydralazine in combination with nitrate

1.5.23 Seek specialist advice and consider offering hydralazine in combination with nitrate (especially if the person is of African or Caribbean family origin and has moderate to severe heart failure [NYHA class III/IV] with reduced ejection fraction). **[2010]**

Digoxin

For recommendations on digoxin for people with atrial fibrillation see the section on rate and rhythm control in the NICE guideline on atrial fibrillation

[1] NICE proposes to incorporate these recommendations in this guideline, subject to a review proposal by the technology appraisals programme.

1.5.24 Digoxin is recommended for worsening or severe heart failure with reduced ejection fraction despite first- and second-line treatment for heart failure[2]. **[2003]**

1.5.25 Routine monitoring of serum digoxin concentrations is not recommended. A digoxin concentration measured within 8–12 hours of the last dose may be useful to confirm a clinical impression of toxicity or non-adherence. **[2003]**

1.5.26 The serum digoxin concentration should be interpreted in the clinical context as toxicity may occur even when the concentration is within the 'therapeutic range'. **[2003]**

1.6 Treating heart failure with reduced ejection fraction in people with chronic kidney disease

1.6.1 For people who have heart failure with reduced ejection fraction and chronic kidney disease, treat according to eGFR (estimated glomerular filtration rate) as follows.

- eGFR 45 ml/min/1.73 m^2 or more: offer the treatment outlined in section 1.5 on treating heart failure with reduced ejection fraction
- eGFR 30 to 44 ml/min/1.73 m^2: consider the treatment outlined in section 1.5 on treating heart failure with reduced ejection fraction
- all eGFR 30 to 59 ml/min/1.73 m^2: consider lower doses and/or slower titration of dose of ACE inhibitors, mineralocorticoid receptor antagonists and digoxin. **[2018]**

1.6.2 Consider liaising with a renal physician for people who have heart failure with reduced ejection fraction and chronic kidney disease with eGFR less than 30 ml/min/1.73 m^2. **[2018]**

[2] For recommendations on digoxin for people with atrial fibrillation see the section on rate and rhythm control in the NICE guideline on atrial fibrillation.

1.6.3 Monitor the response to titration of medicines closely in people who have heart failure with reduced ejection fraction and chronic kidney disease, taking into account the increased risk of hyperkalaemia. **[2018]**

1.6.4 Consider liaising with specialist renal services for advice on managing further deterioration in kidney function that may be caused by heart failure medicines in people who have chronic kidney disease and heart failure with reduced ejection fraction. **[2018]**

1.7 Monitoring treatment for all types of heart failure

See section 1.5 for specific recommendations on monitoring treatment for heart failure with reduced ejection fraction.

Clinical review

1.7.1 All people with chronic heart failure need monitoring. This monitoring should include:

- a clinical assessment of functional capacity, fluid status, cardiac rhythm (minimum of examining the pulse), cognitive status and nutritional status
- a review of medication, including need for changes and possible side effects
- serum electrolytes, creatinine and eGFR[3]. **[2010, amended 2018]**

1.7.2 More detailed monitoring will be needed if the person has significant comorbidity or if their condition has deteriorated since the previous review. **[2003]**

1.7.3 The frequency of monitoring should depend on the clinical status and stability of the person. The monitoring interval should be short (days to 2 weeks) if the clinical condition or medication has changed, but is needed at least 6-monthly for stable people with proven heart failure. **[2003]**

[3] This is a minimum. People with comorbidities or co-prescribed medications will need further monitoring. Monitoring serum potassium is particularly important if a person is taking digoxin or an MRA.

1.7.4 People with heart failure who wish to be involved in monitoring of their condition should be provided with sufficient education and support from their healthcare professional to do this, with clear guidelines as to what to do in the event of deterioration. **[2003]**

Measuring NT-proBNP

1.7.5 Consider measuring NT-proBNP (N-terminal pro-B-type natriuretic peptide) as part of a treatment optimisation protocol only in a specialist care setting for people aged under 75 who have heart failure with reduced ejection fraction and an eGFR above 60 ml/min/1.73 m^2. **[2018]**

1.8 Interventional procedures

Coronary revascularisation

1.8.1 Do not routinely offer coronary revascularisation to people who have heart failure with reduced ejection fraction. **[2018]**

Cardiac transplantation

1.8.2 Specialist referral for transplantation should be considered for people with severe refractory symptoms or refractory cardiogenic shock. **[2003]**

Implantable cardioverter defibrillators and cardiac resynchronisation therapy

See NICE's technology appraisal guidance on implantable cardioverter defibrillators and cardiac resynchronisation therapy for arrhythmias and heart failure.

1.8.3 When discussing implantation of a cardioverter defibrillator:

- explain the risks, benefits and consequences of cardioverter defibrillator implantation, following the principles on shared decision making in the NICE guideline on patient experience in adult NHS services
- ensure the person knows that the defibrillator can be fully deactivated, or partially deactivated without affecting any cardiac resynchronisation device, and reactivated later
- explain the circumstances in which deactivation might be offered, and the potential harms of unnecessary shocks

- discuss and dispel common misconceptions about the function of the device and the consequences of deactivation
- provide the person and, if they wish, their family or carers with written information covering the information discussed. **[2018]**

1.8.4 Review the benefits and potential harms of a cardioverter defibrillator remaining active in a person with heart failure:

- at each 6-monthly review of their heart failure care
- whenever their care goals change
- as part of advance care planning if it is thought they are nearing the end of life. **[2018]**

1.9 Cardiac rehabilitation

1.9.1 Offer people with heart failure a personalised, exercise-based cardiac rehabilitation programme, unless their condition is unstable or they have a condition or device that precludes such a programme. The programme:

- should be preceded by an assessment to ensure that it is suitable for the person
- should be provided in a format and setting (at home, in the community or in the hospital) that is easily accessible for the person
- should include a psychological and educational component
- may be incorporated within an existing cardiac rehabilitation programme
- should be accompanied by information about support available from healthcare professionals when the person is doing the programme. **[2018]**

1.10 Palliative care

1.10.1 Do not offer long-term home oxygen therapy for advanced heart failure. Be aware that long-term home oxygen therapy may be offered for comorbidities such as chronic obstructive pulmonary disease. **[2018]**

1.10.2 Do not use prognostic risk tools to determine whether to refer a person with heart failure to palliative care services. **[2018]**

1.10.3 If the symptoms of a person with heart failure are worsening despite optimal specialist treatment, discuss their palliative care needs with the specialist heart failure multidisciplinary team and consider a needs assessment for palliative care. **[2018]**

1.10.4 People with heart failure and their families or carers should have access to professionals with palliative care skills within the heart failure team. **[2003]**

1.10.5 If it is thought that a person may be entering the last 2 to 3 days of life, follow the NICE guideline on care of dying adults in the last days of life. **[2018]**

Terms used in this guideline

Heart failure with preserved ejection fraction

This is usually associated with impaired left ventricular relaxation, rather than left ventricular contraction, and is characterised by normal or preserved left ventricular ejection fraction.

Heart failure with reduced ejection fraction

Heart failure with an ejection fraction below 40%.

Mineralocorticoid receptor antagonist

A drug that antagonises the action of aldosterone at mineralocorticoid receptors.

Putting this guideline into practice

[This section will be completed after consultation]

NICE has produced tools and resources to help you put this guideline into practice.

Some issues were highlighted that might need specific thought when implementing the recommendations. These were raised during the development of this guideline. They are:

- [add any issues specific to guideline here]
- [Use 'Bullet left 1 last' style for the final item in this list.]

Putting recommendations into practice can take time. How long may vary from guideline to guideline, and depends on how much change in practice or services is needed. Implementing change is most effective when aligned with local priorities.

Changes recommended for clinical practice that can be done quickly – like changes in prescribing practice – should be shared quickly. This is because healthcare professionals should use guidelines to guide their work – as is required by professional regulating bodies such as the General Medical and Nursing and Midwifery Councils.

Changes should be implemented as soon as possible, unless there is a good reason for not doing so (for example, if it would be better value for money if a package of recommendations were all implemented at once).

Different organisations may need different approaches to implementation, depending on their size and function. Sometimes individual practitioners may be able to respond to recommendations to improve their practice more quickly than large organisations.

Here are some pointers to help organisations put NICE guidelines into practice:

1. **Raise awareness** through routine communication channels, such as email or newsletters, regular meetings, internal staff briefings and other communications with all relevant partner organisations. Identify things staff can include in their own practice straight away.

2. **Identify a lead** with an interest in the topic to champion the guideline and motivate others to support its use and make service changes, and to find out any significant issues locally.

3. **Carry out a baseline assessment** against the recommendations to find out whether there are gaps in current service provision.

4. **Think about what data you need to measure improvement** and plan how you will collect it. You may want to work with other health and social care organisations

and specialist groups to compare current practice with the recommendations. This may also help identify local issues that will slow or prevent implementation.

5. **Develop an action plan**, with the steps needed to put the guideline into practice, and make sure it is ready as soon as possible. Big, complex changes may take longer to implement, but some may be quick and easy to do. An action plan will help in both cases.

6. **For very big changes** include milestones and a business case, which will set out additional costs, savings and possible areas for disinvestment. A small project group could develop the action plan. The group might include the guideline champion, a senior organisational sponsor, staff involved in the associated services, finance and information professionals.

7. **Implement the action plan** with oversight from the lead and the project group. Big projects may also need project management support.

8. **Review and monitor** how well the guideline is being implemented through the project group. Share progress with those involved in making improvements, as well as relevant boards and local partners.

NICE provides a comprehensive programme of support and resources to maximise uptake and use of evidence and guidance. See our into practice pages for more information.

Also see Leng G, Moore V, Abraham S, editors (2014) Achieving high quality care – practical experience from NICE. Chichester: Wiley.

Context

Key facts and figures

Heart failure is a complex clinical syndrome of symptoms and signs that suggest the efficiency of the heart as a pump is impaired. It is caused by structural or functional abnormalities of the heart. Around 920,000 people in the UK today have been diagnosed with heart failure. Both the incidence and prevalence of heart failure increase steeply with age, and the average age at diagnosis is 77. Improvements in

care have increased survival for people with ischaemic heart disease, and treatments for heart failure have become more effective. But the overall prevalence of heart failure is rising because of population ageing and increasing rates of obesity.

Current practice

Uptake of NICE's 2010 guidance on chronic heart failure appears to be good (see uptake information). However, the Department of Health's 2013 cardiovascular disease outcomes strategy noted that prescribing of ACE inhibitors, beta-blockers and aldosterone antagonists remains suboptimal, and that improved use of these drugs has the potential to reduce hospitalisations and deaths caused by heart failure. This update reviewed evidence on the clinical and cost effectiveness of these therapies.

Interdisciplinary working has contributed to better outcomes in heart failure but there is further room to improve the provision of multidisciplinary teams (MDTs) and integrate them more fully into healthcare processes. This update highlights and further expands on the roles of the MDT and the primary care team within the MDT.

The 2013 cardiovascular disease outcomes strategy also noted that the proportion of people with heart failure who have cardiac rehabilitation was around 4%, and that increasing this proportion would reduce mortality and hospitalisation. This update recommends that all people with heart failure are offered an easily accessible, exercise-based cardiac rehabilitation programme, if this is suitable for them.

More information

To find out what NICE has said on topics related to this guideline, see our web page on cardiovascular conditions.

Recommendations for research

The guideline committee has made the following recommendations for research The committee's full set of research recommendations is detailed in the full guideline.

1 Diuretic therapy for managing fluid overload in people with advanced heart failure in the community

In people with advanced heart failure and significant peripheral fluid overload, what is the clinical and cost effectiveness of oral, subcutaneous and intravenous diuretic therapy in the community?

Why this is important

This research is critical to inform practice of how best to manage people with advanced heart failure in the community if they develop significant peripheral fluid overload. These people are more likely to have multiple admissions which, together with fluid overload, has a negative impact on their quality of life. Management in the community can minimise disruption for the person and reduce costs from hospital admissions. Knowledge of the most clinically and cost-effective routes of administration for diuretic therapy will dictate the level of resource needed to provide the service. Intravenous and subcutaneous diuretics need to be administered by nursing or healthcare staff, whereas oral formulations do not.

2 Cardiac MRI versus other imaging techniques for diagnosing heart failure

What is the optimal imaging technique for the diagnosis of heart failure?

Why this is important

The role of cardiac MRI in the detection and characterisation of several structural and functional cardiac abnormalities has become well established over the past 25 years. In people with heart failure, cardiac MRI provides reliable and reproducible assessments of the left ventricular (and to a degree the right ventricular) shapes, volumes and ejection fractions. It also provides spatial assessments of the congenital and acquired structural abnormalities of the heart and their interrelationships with the remainder of the heart, as well as functional and haemodynamic assessments of these abnormalities on the heart's performance. Finally, cardiac MRI provides valuable information about the myocardial structure and metabolism, including the presence of inflammation, scarring, fibrosis and infiltration. Much of this information could be provided by other non-invasive imaging

techniques, chiefly echocardiography. This question aims to find the optimal imaging technique for the clinical diagnosis of heart failure.

3 The impact of atrial fibrillation on the natriuretic peptide threshold for diagnosing heart failure

What is the optimal NT-proBNP threshold for the diagnosis of heart failure in people with atrial fibrillation?

Why this is important

Atrial fibrillation is a common arrhythmia in the general population, and occurs in 30% to 40% of people with heart failure. Atrial fibrillation can raise the level of serum natriuretic peptides, including NT-proBNP, even in the absence of heart failure. This is complicated further in heart failure with preserved ejection fraction, in which 2 echocardiographic diagnostic criteria become unreliable (the left atrial volume and the tissue doppler imaging assessment of diastolic function). These factors contribute to the complexity of the diagnosis and have a potential impact on the usual thresholds for NT-proBNP in people who have atrial fibrillation. This has been recognised in several ongoing randomised controlled trials of heart failure, which are using higher NT-proBNP thresholds for the diagnosis of heart failure in people with atrial fibrillation.

4 The impact of advanced kidney disease on the natriuretic peptide threshold for diagnosing heart failure

What are the optimal NT-proBNP thresholds for diagnosing heart failure in people with stage IIIb, IV or V chronic kidney disease?

Why this is important

Heart failure incidence and prevalence increase with age, with the rise starting at age 65 and peaking between 75 and 85. Both advancing age and heart failure are associated with a gradual and progressive decline in renal function. In addition, the progression of heart failure and some treatments for heart failure lead to progressive deterioration of renal function. A decline in renal function is associated with increased fluid retention and a rise in the level of the serum natriuretic peptides, including NT-proBNP, even in the absence of heart failure. There is some evidence

that the use of higher NT-proBNP thresholds would improve diagnostic accuracy for heart failure in people with significant deterioration of creatinine clearance.

5 Risk tools for predicting non-sudden death in heart failure

How accurate are prognostic risk tools in predicting 1-year mortality from heart failure at specific clinically relevant thresholds (for example, sensitivity, specificity, negative predictive value and positive predictive value at a threshold of 50% risk of mortality at 1 year)?

Why this is important

There are a number of validated prognostic risk tools for heart failure but most do not report sensitivity and specificity at clinically relevant thresholds. This information is crucial to enable accurate prediction of a person's risk of mortality. The ability to accurately predict a person's prognosis would allow clearer communication and timely referral to other services such as palliative care. Inaccurate prediction has the potential to lead to significant psychological harm and increased morbidity.

Update information

March 2018

This guideline updates and replaces NICE clinical guideline 108 (published August 2010). NICE clinical guideline 108 updated and replaced NICE clinical guideline 5 (published July 2003).

Recommendations are marked as **[2018]** if the recommendation is new or the evidence has been reviewed.

NICE proposes to delete some recommendations from the 2010 guideline, because either the evidence has been reviewed and the recommendations have been updated, or NICE has updated other relevant guidance and has replaced the original recommendations. Recommendations that have been deleted or changed sets out these recommendations and includes details of replacement recommendations. Where there is no replacement recommendation, an explanation for the proposed deletion is given.

Where recommendations are shaded in grey and end **[2003]** or **[2003, amended 2010]**, the evidence has not been reviewed since the 2003 guideline. Where recommendations are shaded in grey and end **[2010]**, the evidence has not been reviewed since the 2010 guideline. Recommendations shaded in grey that end **[2012]** refer to technology appraisal guidance published in 2012.

Where recommendations are shaded in grey and end **[2003, amended 2018]** or **[2010, amended 2018]**, the evidence has not been reviewed but changes have been made to the recommendation wording that change the meaning (for example, because of equalities duties or a change in the availability of medicines, or incorporated guidance has been updated). These changes are marked with yellow shading, and explanations of the reasons for the changes are given in 'Recommendations that have been deleted or changed' for information.

See also the original NICE guideline and supporting documents.

Recommendations that have been deleted or changed

Recommendations to be deleted

Recommendation in 2010 guideline	Comment
1.1.1.2 Refer patients with suspected heart failure and previous myocardial infarction (MI) urgently, to have transthoracic Doppler 2D echocardiography and specialist assessment within 2 weeks.	Replaced by recommendation 1.2.2.The guideline committee agreed that the distinction between people with and without previous MI is not supported by current clinical evidence. They agreed that NT-proBNP should be measured in all people with suspected heart failure before referral for doppler echocardiography and specialist assessment..
1.1.1.11 Consider a serum natriuretic peptide test (if not already performed) when heart failure is still suspected after transthoracic Doppler 2D echocardiography has shown a preserved left ventricular ejection fraction.	Superseded by recommendation 1.2.2, which recommends NT-proBNP measurement for all people with suspected heart failure before referral for doppler echocardiography.
1.2.1.4 Be prepared to broach sensitive issues that are unlikely to be raised by the person with heart failure, such as sexual activity.	This is now covered in the NICE guideline on patient experience in adult NHS services
1.2.2.1 Dosing regimens should be kept as simple as possible, and the healthcare professional should ensure that the patient and carer are fully informed about their medication.	This is now covered in the NICE guideline on medicines adherence.
1.2.2.3 Seek specialist advice before offering second-line treatment to patients with heart failure due to left ventricular systolic dysfunction.	Replaced by recommendation 1.5.16.
1.2.2.4 Seek specialist advice and consider adding one of the following if a patient remains symptomatic despite optimal therapy with an ACE inhibitor and a beta-blocker: • an aldosterone antagonist licensed for heart failure (especially if the patient has moderate to severe heart failure [NYHA class III–IV] or has had an MI within the past month or • an angiotensin II receptor antagonist (ARB) licensed for heart failure (especially if the patient has mild to moderate heart failure [NYHA class II–III or • hydralazine in combination with nitrate (especially if the patient is of African or Caribbean origin and has moderate to severe heart failure [NYHA class III–IV]).	Replaced by recommendation 1.5.16.

1.2.2.10 In patients with heart failure due to left ventricular systolic dysfunction who are taking aldosterone antagonists, closely monitor potassium and creatinine levels, and eGFR. Seek specialist advice if the patient develops hyperkalaemia or renal function deteriorates.	Replaced by recommendation 1.5.17.
1.2.2.11 For patients who have had an acute MI and who have symptoms and/or signs of heart failure and left ventricular systolic dsfunction, trtment with an aldosterone antagonist licensed for post-MI treatment should be initiated within 3–14 dys of the MI, preferably after ACE inhibitor therapy. (This recommendation is from 'MI: secondary prevention', NICE clinical guideline 48).	NICE's guideline 'MI: secondary prevention' has been replaced by its guideline on myocardial infarction
1.2.2.12 Patients who have recently had an acute MI and have clinical heart failure and left ventricular systolic dysfunction, but who are already being teated with an aldosterone antagonist for a concomitant condition (for example, chronic heart failure), should continue with the aldosterone antagonist or an alternative, licensed for early post-MI treatment. (This recommendation is from 'MI: secondary prevention', NICE clinical guideline 48.	NICE's guideline 'MI: secondary prevention' has been replaced by its guideline on myocardial infarction
1.2.2.23 Manage comorbidities according to: • 'Hypertension', NICE clinical guideline 34 (replaced by 'Hypertension' [NICE clinical guideline 127]) • MI: secondary prevention', NICE clnical guideline 48 • 'Type 2 diabetes', NICE clinical guideline 87 • and other relevant NICE guidance. This is particularly important in heart failure with preserved ejection fraction.	These guidelines have been replaced or updated. Current NICE guidelines on these and other comorbidities are available from the NICE website and in NICE Pathways.
1.4.1.5 When a patient is admitted to hospital because of heart failure, seek advice on their management plan from a specialist in heart failure.	Acute admissions are covered in the NICE guideline on acute heart failure.
1.4.3.1 Consider specialist monitoring of serum natriuretic peptides in some patients (for example, those in whom uptitration is problematic or those who have been admitted to hospital).	Replaced by recommendation 1.7.5.

1.5.2.2 The primary care team, patient and carer must be aware of the management plan.	Replaced by recommendations 1.1.4 and 1.1.9.
1.5.2.3 Clear instructions should be given as to how the patient/carer can acces advice, particularly in the high-risk period immediately following discharge.	Replaced by recommendation 1.1.8.
1.5.6.1 Prognosis should be discussed with patients and carers in a sensitive, open and honest manner.	Replaced by recommendation 1.3.2.
1.5.9.1 Issues of sudden death and living with uncertainty are pertinent to all patients with heart failure. The opportunity to discuss these issues should be available at all stages of care.	Replaced by recommendations 1.3.2 and 1.3.5.
1.5.9.2 The palliative care needs of patients and carers should be identified, assessed and managed at the earliest opportunity.	Replaced by recommendation 1.10.3.

Amended recommendation wording (change to meaning)

Recommendation in 2010 guideline	Recommendation in current guideline	Reason for change
Be aware that: • obesity or treatment with diuretics, angiotensin-converting enzyme (ACE) inhibitors, beta-blockers, angiotensin II receptor antagonists (ARBs) and aldosterone antagonists can reduce levels of serum natriuretic peptides • high levels of serum natriuretic peptides can have causes other than heart failure (for example, left ventricular hypertrophy, ischaemia, tachycardia, right ventricular overload, hypoxaemia [including pulmonary embolism], renal dysfunction [GFR 60 ml/minute], sepsis, chronic obstructive pulmonary disease [COPD], diabetes, age 70 years and cirrhosis of the liver). (1.1.1.6)	Be aware that: • obesity, African or African-Caribbean family origin, or treatment with diuretics, angiotensin-converting enzyme (ACE) inhibitors, beta-blockers, angiotensin II receptor antagonists (ARBs) and aldosterone antagonists can reduce levels of serum natriuretic peptides • high levels of serum natriuretic peptides can have causes other than heart failure (for example, left ventricular hypertrophy, ischaemia, tachycardia, right ventricular overload, hypoxaemia [including pulmonary embolism], renal dysfunction [GFR 60 ml/minute], sepsis, chronic obstructive pulmonary disease [COPD], diabetes, age 70 years and cirrhosis of the liver). (1.2.7)	African or African-Caribbean family origin has been added because of the high incidence of heart failure with preserved ejection fraction in these populations. Recent evidence shows that NT-proBNP levels are lower in people of west African family origin and are a confounder in the diagnosis of heart failure.
Consider alternative methods of imaging the heart (for example, radionuclide angiography, cardiac magnetic resonance imaging or transoesophageal Doppler 2D echocardiography) when a poor image is produced by transthoracic Doppler 2D echocardiography. (1.1.1.10)	Consider alternative methods of imaging the heart (for example, radionuclide angiography [multigated acquisition scanning], cardiac MRI or transoesophageal doppler 2D echocardiography) if a poor image is produced by transthoracic doppler 2D echocardiography. (1.2.11)	Multigated acquisition scanning has been added to reflect current imaging technology.

Perform an ECG and consider the following tests to evaluate possible aggravating factors and/or alternative diagnoses: • chest X-ray • blood tests: - electrolytes, urea and creatinine - eGFR (estimated glomerular filtration rate) - thyroid function tests - liver function tests - fasting lipids - fasting glucose - full blood count • urinalysis • peak flow or spirometry (1.1.1.13)	Perform an ECG and consider the following tests to evaluate possible aggravating factors and/or alternative diagnoses: • chest X-ray • blood tests: - electrolytes and creatinine including eGFR (estimated glomerular filtration rate) - thyroid function tests - liver function tests - lipid measurement - glycosylated haemoglobin (HbA_{1c}) - full blood count • urinalysis • peak flow or spirometry (1.2.12)	Measurement of urea has been deleted because the guideline committee agreed that it is not needed and is not part of renal profiles in most centres in the UK. Blood tests for electrolytes, creatinine and eGFR have been grouped together because they are provided as a unified set of analyses in the NHS. Fasting lipid tests have been replaced with lipid measurement in line with the NICE guideline on cardiovascular disease. Fasting glucose has been replaced with glycosylated haemoglobin (HbA_{1c}) in line with the NICE guidelines on diabetes.
Try to exclude other disorders that may present in a similar manner. (1.1.1.14)	Try to exclude other disorders that may present in a similar manner, such as pulmonary fibrosis. (1.2.13)	Pulmonary fibrosis has been added as an example for clarification.

The diagnosis and treatment of heart failure with preserved ejection fraction should be made by a specialist, and other conditions that present in a similar way my need to be considered. Patients in whom this diagnosis has been made should usually be treated with a low to medium dose of loop diuretic (for example, less than 80 mg furosemide per day). Patients who do not respond to this treatment will require specialist advice. (1.2.2.18)	People who have heart failure with preserved ejection fraction should usually be offered a low to medium dose of loop diuretics (for example, less than 80 mg furosemide per day). People whose heart failure does not respond to this treatment will need further specialist advice. (1.4.2)	The first sentence has been removed because it is covered in recommendations and 1.1.3 and 1.2.6.
Amlodipine should be considered for the treatment of comorbid hypertension and/or angina in patients with heart failure, but verapamil, diltiazem or short-acting dihydropyridine agents should be avoided. (1.2.2.19)	Avoid verapamil, diltiazem and short-acting dihydropyridine agents in people who have heart failure with reduced ejection fraction. (1.4.3)	Amlodipine to treat hypertension has been superseded by the NICE guideline on hypertension in adults.
The need to continue the amiodarone prescription should be reviewed regularly. (1.2.2.21)	Review the need to continue the amiodarone prescription at the 6-monthly clinical review. (1.4.5)	'Regularly' has been replaced with 'at the 6-monthly clinical review' for clarification.
Patients taking amiodarone should have a routine 6-montly clinical review, including liver and thyroid function test, and including a review of side effects.	Offer people taking amiodarone liver and thyroid function tests, and a review of side effects, as part of their routine 6-monthly clinical review (1.4.6)	The wording has been amended in line with recommendation 1.4.5.

Measure serum urea, creatinine, electrolytes and eGFR at initiation of an ACE inhibitor and after each dose increment. (1.2.2.6)	Measure serum sodium, potassium, creatinine and estimated glomerular filtration rate (eGFR) before and 1 to 2 weeks after starting an ACE inhibitor, and after each dose increment. (1.5.6) Once the target or maximum tolerated dose is reached, monitor treatment monthly for 3 months and then at least every 6 months, and at any time the person becomes acutely unwell. (1.5.8)	Measurement of serum urea has been deleted because the guideline committee agreed that it is not needed and is not part of renal profiles in most centres in the UK. Measurement of potassium has been addded to ensure that monitoring is consistent across treatments. A recommendation has been added to clarify the timing of monitoring after treatment starts.
Introduce beta-blockers in a 'start low, go slow' manner, and assess heart rate, blood pressure, and clinical status after each titration. (1.2.2.8)	Introduce beta-blockers in a ‘start low, go slow’ manner. Assess heart rate and clinical status after each titration. Measure blood pressure before and after each dose increment of a beta-blocker. (1.5.9)	Blood pressure measurement has been clarified and made consistent with other treatments.
Monitor serum urea, electrolytes, creatinine and eGFR for signs of renal impairment or hyperkalaemia in patients with heart failure who are taking an ARB. (1.2.2.15)	Measure serum sodium, potassium, creatinine and eGFR before and after starting an ARB and after each dose increment (1.5.12). Once the target or maximum tolerated dose is reached, monitor treatment monthly for 3 months and then at least every 6 months, and at any time the person becomes acutely unwell. (1.5.14)	Measurement of urea has been deleted because the guideline committee agreed that it is not needed and is not part of renal profiles in most centres in the UK. Monitoring for hyperkalaemia has been replaced by potassium measurement for clarity. A recommendation has been added to clarify the timing of monitoring after treatment starts.

All people with chronic heart failure need monitoring. This monitoring should include: • a clinical assessment of functional capacity, fluid status, cardiac rhythm (minimum of examining the pulse), cognitive status and nutritional status • a review of medication, including need for changes and possible side effects • serum urea, electrolytes, creatinine and eGFR. (1.4.1.1)	All people with chronic heart failure need monitoring. This monitoring should include: • a clinical assessment of functional capacity, fluid status, cardiac rhythm (minimum of examining the pulse), cognitive status and nutritional status • a review of medication, including need for changes and possible side effects • serum electrolytes, creatinine and eGFR. (1.7.1)	Measurement of urea has been deleted because the guideline committee agreed that it is not needed and is not part of renal profiles in most centres in the UK.

Changes to recommendation wording for clarification only (no change to meaning)

Recommendation numbers in current guideline	Comment
All recommendations except those labelled [2018]	'Heart failure due to left ventricular systolic dystunction' has been changed to 'heart failure with reduced ejection fraction' to reflect current terminology, and in line with the 2018 guideline scope. Yellow highlighting has not been applied to these changes.
All recommendations except those labelled [2018]	'Aldosterone antagonist' has been changed to 'mineralocorticoid receptor antagonist' to clarify the function of the receptor, and in line with the 2018 guideline scope. Yellow highlighting has not been applied to these changes.
All recommendations except those labelled **[2018]**	Recommendations have been edited into the direct style (in line with current NICE style for recommendations in guidelines) where possible. Yellow highlighting has not been applied to these changes.
All recommendations except those labelled **[2018]**	'Patient' and 'patients' have been changed to 'person' and 'people' (in line with current NICE style for recommendations in guidelines). Yellow highlighting has not been applied to these changes.
1.4.12 In women of childbearing potential who have heart failure, contraception and pregnancy should be discussed. If pregnancy is being considered or occurs, specialist advice should be sought. Subsequently, specialist care should be shared between the cardiologist and obstetrician.	'women of childbearing potential' has replaced 'women of reproductive age' in line with current NICE style. Yellow highlighting has not been applied to this change.

ISBN: