



***National Institute for
Health and Clinical Excellence***

Quick reference guide

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Hypertension

Clinical management of primary hypertension in adults

This updates and replaces NICE clinical guideline 34



NICE clinical guideline 127

Developed by the Newcastle Guideline Development and Research Unit and updated by the National Clinical Guideline Centre (formerly the National Collaborating Centre for Chronic Conditions) and the British Hypertension Society

About this booklet

This is a quick reference guide that summarises the recommendations NICE has made to the NHS in 'Hypertension: clinical management of primary hypertension in adults' (NICE clinical guideline 127). This guidance updates and replaces NICE clinical guideline 34 (published June 2006).

Who wrote the guideline?

The original guideline was developed by the Newcastle Guideline Development and Research Unit and published in 2004. The guideline was updated by the National Clinical Guideline Centre (NCGC) (formerly the National Collaborating Centre for Chronic Conditions) in collaboration with the British Hypertension Society (BHS) in 2006 and 2011.

Recommendations from the original 2004 guideline are marked with footnotes. All other recommendations were developed by the NCGC in collaboration with the BHS for the 2006 and 2011 updated guidelines.

Person-centred care






Treatment and care should take into account people's individual needs and preferences. Good communication is essential, supported by evidence-based information, to allow people to reach informed decisions about their care. Follow advice on seeking consent from the Department of Health or Welsh Government if needed. If the person agrees, families and carers should have the opportunity to be involved in decisions about treatment and care.

NICE clinical guidelines are recommendations about the treatment and care of people with specific diseases and conditions in the NHS in England and Wales.

This guidance represents the view of NICE, which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer, and informed by the summary of product characteristics of any drugs they are considering.

Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.

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Introduction

Hypertension is one of the most important preventable causes of premature morbidity and mortality in the UK, and its management is one of the most common interventions in primary care. This guideline contains new and updated recommendations on blood pressure measurement, the use of ambulatory and home blood pressure monitoring, blood pressure targets and antihypertensive drug treatment.

Definitions used in this booklet

Stage 1 hypertension Clinic blood pressure is 140/90 mmHg or higher **and** subsequent ambulatory blood pressure monitoring (ABPM) daytime average or home blood pressure monitoring (HBPM) average blood pressure is 135/85 mmHg or higher.

Stage 2 hypertension Clinic blood pressure is 160/100 mmHg or higher **and** subsequent ABPM daytime average or HBPM average blood pressure is 150/95 mmHg or higher.

Severe hypertension Clinic systolic blood pressure is 180 mmHg or higher, **or** clinic diastolic blood pressure is 110 mmHg or higher.

Key priorities for implementation

Diagnosing hypertension

- If the clinic blood pressure is 140/90 mmHg or higher, offer ambulatory blood pressure monitoring (ABPM) to confirm the diagnosis of hypertension.
- When using ABPM to confirm a diagnosis of hypertension, ensure that at least two measurements per hour are taken during the person's usual waking hours (for example, between 08:00 and 22:00). Use the average value of at least 14 measurements taken during the person's usual waking hours to confirm a diagnosis of hypertension.
- When using home blood pressure monitoring (HBPM) to confirm a diagnosis of hypertension, ensure that:
 - for each blood pressure recording, two consecutive measurements are taken, at least 1 minute apart and with the person seated **and**
 - blood pressure is recorded twice daily, ideally in the morning and evening **and**
 - blood pressure recording continues for at least 4 days, ideally for 7 days.

Discard the measurements taken on the first day and use the average value of all the remaining measurements to confirm a diagnosis of hypertension.

Initiating and monitoring antihypertensive drug treatment, including blood pressure targets

Initiating treatment

- Offer antihypertensive drug treatment to people aged under 80 years with stage 1 hypertension who have one or more of the following:
 - target organ damage
 - established cardiovascular disease
 - renal disease
 - diabetes
 - a 10-year cardiovascular risk equivalent to 20% or greater.
- Offer antihypertensive drug treatment to people of any age with stage 2 hypertension.
- For people aged under 40 years with stage 1 hypertension and no evidence of target organ damage, cardiovascular disease, renal disease or diabetes, consider seeking specialist evaluation of secondary causes of hypertension and a more detailed assessment of potential target organ damage. This is because 10-year cardiovascular risk assessments can underestimate the lifetime risk of cardiovascular events in these people.

Monitoring treatment and blood pressure targets

- For people identified as having a 'white-coat effect'¹, consider ABPM or HBPM as an adjunct to clinic blood pressure measurements to monitor the response to antihypertensive treatment with lifestyle modification or drugs.

Continued

¹ A discrepancy of more than 20/10 mmHg between clinic and average daytime ABPM or average HBPM blood pressure measurements at the time of diagnosis.

Key priorities for implementation *continued*

Choosing antihypertensive drug treatment

- Offer people aged 80 years and over the same antihypertensive drug treatment as people aged 55–80 years, taking into account any comorbidities.

Step 1 treatment

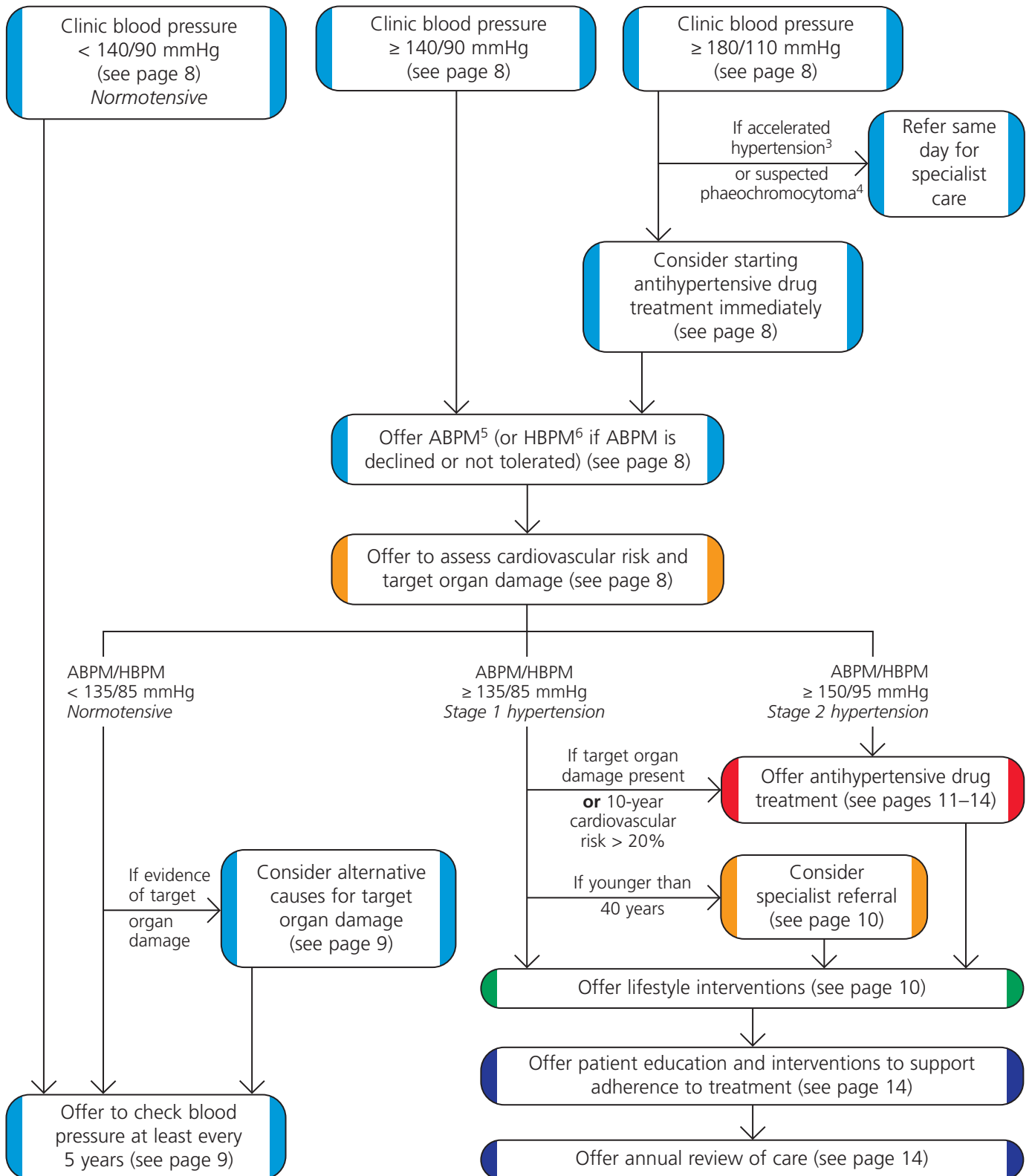
- Offer step 1 antihypertensive treatment with a calcium-channel blocker (CCB) to people aged over 55 years and to black people of African or Caribbean family origin of any age. If a CCB is not suitable, for example because of oedema or intolerance, or if there is evidence of heart failure or a high risk of heart failure, offer a thiazide-like diuretic.
- If a diuretic treatment is to be initiated or changed, offer a thiazide-like diuretic, such as chlortalidone (12.5–25.0 mg once daily) or indapamide (1.5 mg modified-release or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide or hydrochlorothiazide.
- For people who are already having treatment with bendroflumethiazide or hydrochlorothiazide and whose blood pressure is stable and well controlled, continue treatment with the bendroflumethiazide or hydrochlorothiazide.

Step 4 treatment

- For treatment of resistant hypertension at step 4:
 - Consider further diuretic therapy with low-dose spironolactone (25 mg once daily)² if the blood potassium level is 4.5 mmol/l or lower. Use particular caution in people with a reduced estimated glomerular filtration rate because they have an increased risk of hyperkalaemia.
 - Consider higher-dose thiazide-like diuretic treatment if the blood potassium level is higher than 4.5 mmol/l.

² At the time of publication (August 2011), spironolactone did not have a UK marketing authorisation for this indication. Informed consent should be obtained and documented.

Care pathway for hypertension



³ Signs of papilloedema or retinal haemorrhage.
⁴ Labile or postural hypotension, headache, palpitations, pallor and diaphoresis.
⁵ Ambulatory blood pressure monitoring.
⁶ Home blood pressure monitoring.

Measuring blood pressure

- Healthcare professionals taking blood pressure measurements need adequate initial training and should have their performance reviewed periodically⁷.
- Devices for measuring blood pressure must be properly validated, maintained and regularly recalibrated according to manufacturers' instructions⁷.
- If using an automated blood pressure monitoring device, ensure that the device is validated⁸ and an appropriate cuff size for the person's arm is used.
- When measuring blood pressure in the clinic or in the home, standardise the environment and provide a relaxed, temperate setting, with the person quiet and seated, and their arm outstretched and supported.
- Palpate the radial or brachial pulse before measuring blood pressure, since automated devices may not measure blood pressure accurately if there is pulse irregularity (for example, due to atrial fibrillation). If pulse irregularity is present, measure blood pressure manually, using direct auscultation over the brachial artery.

Postural hypotension

- In people with symptoms of postural hypotension (falls or postural dizziness):
 - measure blood pressure with the person either supine or seated
 - measure blood pressure again with the person standing for at least 1 minute prior to measurement.
- If the systolic blood pressure falls by 20 mmHg or more when the person is standing:
 - review medication
 - measure subsequent blood pressures with the person standing
 - consider referral to specialist care if symptoms of postural hypotension persist.

⁷ This recommendation was developed for the original 2004 guideline.

⁸ A list of validated blood pressure monitoring devices is available on the British Hypertension Society's website (see www.bhsoc.org). The British Hypertension Society is an independent reviewer of published work. This does not imply any endorsement by NICE.

Diagnosing hypertension

Measuring the clinic blood pressure

- Measure blood pressure in both arms.
 - If the difference in readings between arms is more than 20 mmHg, repeat the measurements.
 - If the difference in readings between arms remains more than 20 mmHg on the second measurement, measure subsequent blood pressures in the arm with the higher reading.
- If blood pressure measured in the clinic is 140/90 mmHg or higher:
 - Take a second measurement during the consultation.
 - If the second measurement is substantially different from the first, take a third measurement.

Record the lower of the last two measurements as the clinic blood pressure.

Confirming the diagnosis

- If the clinic blood pressure is 140/90 mmHg or higher, offer ABPM to confirm the diagnosis of hypertension.
- If a person is unable to tolerate ABPM, HBPM is a suitable alternative to confirm the diagnosis of hypertension.
- While waiting to confirm the diagnosis, carry out investigations for target organ damage and a formal assessment of cardiovascular risk (see page 10).

Severe hypertension

- Consider starting antihypertensive drug treatment immediately, without waiting for the results of ABPM or HBPM, for people with severe hypertension.

Specialist investigations

- Refer people to specialist care the same day if they have:
 - accelerated hypertension (blood pressure usually higher than 180/110 mmHg with signs of papilloedema and/or retinal haemorrhage) **or**
 - suspected pheochromocytoma (labile or postural hypotension, headache, palpitations, pallor and diaphoresis).
- Consider the need for specialist investigations in people with signs and symptoms suggesting a secondary cause of hypertension.

Using ambulatory or home blood pressure monitoring

Ambulatory blood pressure monitoring

- Ensure that at least two measurements per hour are taken during the person's usual waking hours (for example, between 08:00 and 22:00).
- Use the average value of at least 14 measurements taken during the person's usual waking hours to confirm the diagnosis.

Home blood pressure monitoring

- Ensure that:
 - for each blood pressure recording, two consecutive measurements are taken, at least 1 minute apart and with the person seated
 - blood pressure is recorded twice daily, ideally in the morning and evening
 - blood pressure recording continues for at least 4 days, ideally for 7 days.
- Discard the measurements taken on the first day and use the average value of all the remaining measurements to confirm the diagnosis.

If hypertension is not diagnosed

- Offer to measure the person's blood pressure at least every 5 years.
- Consider measuring it more often than every 5 years if the person's clinic blood pressure is close to 140/90 mmHg.
- If there is evidence of target organ damage such as left ventricular hypertrophy, albuminuria or proteinuria, consider carrying out investigations for alternative causes of the target organ damage.

Assessing cardiovascular risk and target organ damage

- Use a formal estimation of cardiovascular risk to discuss prognosis and healthcare options with people with hypertension, both for raised blood pressure and other modifiable risk factors^{9,10}.
- Estimate cardiovascular risk in line with the recommendations on **Identification and assessment of CVD risk** in 'Lipid modification'¹¹.
- Assess target organ damage¹²:
 - Test for the presence of protein in the urine by sending a urine sample for estimation of the albumin:creatinine ratio and test for haematuria using a reagent strip.
 - Take a blood sample to measure plasma glucose, electrolytes, creatinine, estimated glomerular filtration rate (eGFR), serum total cholesterol and HDL cholesterol.
 - Examine the fundi for the presence of hypertensive retinopathy.
 - Arrange for a 12-lead electrocardiograph to be performed.
- For people aged under 40 with stage 1 hypertension, consider seeking specialist evaluation of secondary causes of hypertension and a more detailed assessment of target organ damage. This is because 10-year cardiovascular risk assessments can underestimate the lifetime risk of cardiovascular events in these people.

Lifestyle interventions

- Lifestyle advice should be offered initially and then periodically to people undergoing assessment or treatment for hypertension^{9,13}.
- Ask people about their diet and exercise patterns, and offer guidance and written or audiovisual materials to promote lifestyle changes⁹.
- Ask people about their alcohol consumption and encourage them to cut down if they drink excessively⁹.
- Discourage excessive consumption of coffee and other caffeine-rich products⁹.
- Encourage people to keep their salt intake low or substitute sodium salt⁹.
- Offer people who smoke advice and help to stop smoking⁹.
- Tell people about local initiatives (for example, run by healthcare teams or patient organisations) that provide support and promote lifestyle change⁹.
- Do not offer calcium, magnesium or potassium supplements as a method of reducing blood pressure⁹.
- Relaxation therapies can reduce blood pressure and people may wish to try them. However, it is not recommended that primary care teams provide them routinely⁹.

⁹ This recommendation was developed for the original 2004 guideline.

¹⁰ Clinic blood pressure measurements must be used in the calculation of cardiovascular risk.

¹¹ NICE clinical guideline 67 (2008), available from www.nice.org.uk/guidance/CG67

¹² For NICE guidance on the early identification and management of chronic kidney disease see 'Chronic kidney disease' (NICE clinical guideline 73, 2008), available from www.nice.org.uk/guidance/CG73

¹³ For NICE guidance on the prevention of obesity and cardiovascular disease see 'Obesity' (NICE clinical guideline 43, 2006), available from www.nice.org.uk/guidance/CG43, and 'Prevention of cardiovascular disease at population level' (NICE public health guidance 25, 2010), available from www.nice.org.uk/guidance/PH25

Antihypertensive drug treatment

General principles

- If possible, offer drugs taken only once a day¹⁴.
- Prescribe non-proprietary drugs if these are appropriate and minimise cost¹⁴.
- Offer people with isolated systolic hypertension (systolic blood pressure 160 mmHg or higher) the same treatment as people with both raised systolic and diastolic blood pressure¹⁴.
- Offer people aged over 80 years the same antihypertensive drug treatment as people aged 55–80 years, taking into account any comorbidities.
- Do not combine an angiotensin-converting enzyme (ACE) inhibitor with an angiotensin II receptor blocker (ARB).
- Offer antihypertensive drug treatment to women of child-bearing potential in line with the recommendations on **Management of pregnancy with chronic hypertension** and **Breastfeeding** in 'Hypertension in pregnancy'¹⁵.

Initiating and titrating antihypertensive drug treatment

Also see the 'Summary of antihypertensive drug treatment' on page 13.

Step 1 treatment

- Offer step 1 treatment to people aged under 80 with stage 1 hypertension and one or more of:
 - target organ damage
 - established cardiovascular disease
 - renal disease
 - diabetes
 - 10-year cardiovascular risk equivalent to 20% or more.
- Offer step 1 treatment to people of any age with stage 2 hypertension.
- Offer people aged under 55 years an ACE inhibitor or a low-cost ARB. If an ACE inhibitor is prescribed and is not tolerated (for example, because of cough), offer a low-cost ARB.
- Offer people aged over 55 years and black people of African or Caribbean family origin of any age a calcium-channel blocker (CCB). If a CCB is not suitable, for example because of oedema or intolerance, or if there is evidence of heart failure or a high risk of heart failure, offer a thiazide-like diuretic.
- If treatment with a diuretic is being started, or changed, offer a thiazide-like diuretic, such as chlortalidone (12.5–25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide or hydrochlorothiazide.

¹⁴ This recommendation was developed for the original 2004 guideline.

¹⁵ NICE clinical guideline 107 (2010), available from www.nice.org.uk/guidance/CG107

- For people who are already having treatment with bendroflumethiazide or hydrochlorothiazide and whose blood pressure is stable and well controlled, continue treatment with the bendroflumethiazide or hydrochlorothiazide.
- Beta-blockers are not preferred in step 1. However, they may be considered for younger people if ACE inhibitors and ARBs are contraindicated or not tolerated or there is evidence of increased sympathetic drive, and for women of child-bearing potential.
- If blood pressure is not controlled by step 1 treatment, offer step 2 treatment.

Step 2 treatment

- Offer a CCB in combination with either an ACE inhibitor or an ARB¹⁶.
- If a CCB is not suitable, for example because of oedema or intolerance, or if there is evidence of heart failure or a high risk of heart failure, offer a thiazide-like diuretic.
- For black people of African or Caribbean family origin, consider an ARB¹⁶ in preference to an ACE inhibitor, in combination with a CCB.
- If a beta-blocker was used in step 1, add a CCB rather than a thiazide-type diuretic, to reduce the person's risk of developing diabetes.
- Before considering step 3 treatment, review medication to ensure step 2 treatment is at optimal or best tolerated doses.

Step 3 treatment

- Offer an ACE inhibitor or an ARB¹⁶ in combination with a CCB and a thiazide-like diuretic.
- Regard clinic blood pressure that remains 140/90 mmHg or higher after step 3 treatment with optimal or best tolerated doses as resistant hypertension. Consider step 4 treatment or seeking expert advice.

Step 4 treatment

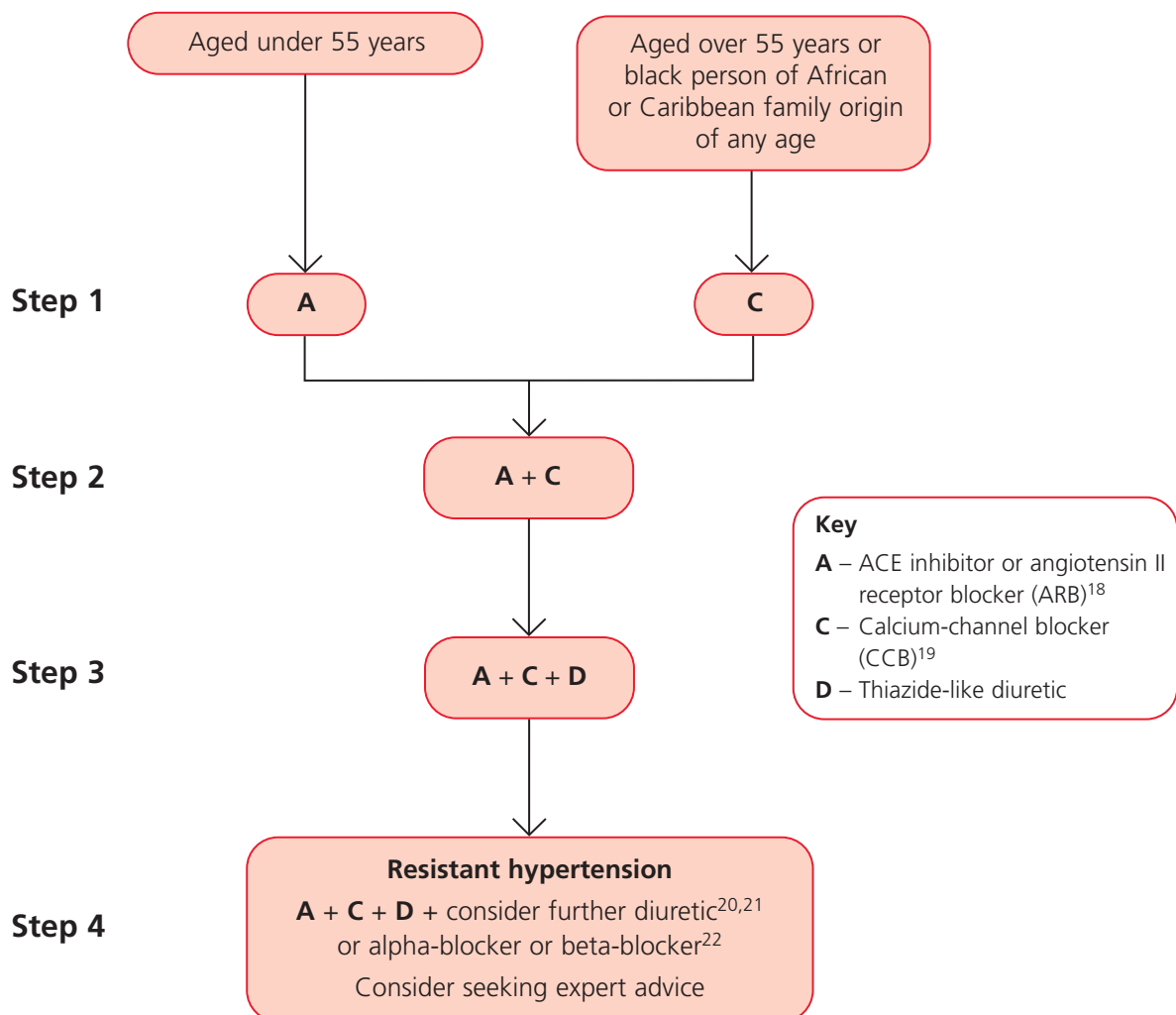
- Consider further diuretic therapy with low-dose (25 mg once daily) spironolactone¹⁷ if blood potassium level is 4.5 mmol/l or lower. Use particular caution in people with a reduced eGFR, because they have an increased risk of hyperkalaemia.
- Consider further diuretic therapy with a higher-dose thiazide-like diuretic if blood potassium level is higher than 4.5 mmol/l.
- When using further diuretic therapy, monitor blood sodium and potassium and renal function within 1 month and repeat as required thereafter.
- If further diuretic therapy is not tolerated, or is contraindicated or ineffective, consider an alpha- or beta-blocker.
- If blood pressure remains uncontrolled with optimal or maximum tolerated doses of four drugs, seek expert advice if it has not yet been obtained.

¹⁶ Choose a low-cost ARB.

¹⁷ At the time of publication (August 2011), spironolactone did not have a UK marketing authorisation for this indication. Informed consent should be obtained and documented.

Summary of antihypertensive drug treatment

Also see 'Initiating and titrating antihypertensive drug treatment' on pages 11–12.



¹⁸ Choose a low-cost ARB.

¹⁹ A CCB is preferred but consider a thiazide-like diuretic if a CCB is not tolerated or the person has oedema, evidence of heart failure or a high risk of heart failure.

²⁰ Consider a low dose of spironolactone²¹ or higher doses of a thiazide-like diuretic.

²¹ At the time of publication (August 2011), spironolactone did not have a UK marketing authorisation for this indication. Informed consent should be obtained and documented.

²² Consider an alpha-blocker or beta-blocker if further diuretic therapy is not tolerated, or is contraindicated or ineffective.

Monitoring treatment

- Use clinic blood pressure measurement to monitor the response to treatment.
- For people identified as having a 'white-coat effect'²³, consider ABPM or HBPM as an adjunct to clinic blood pressure measurements to monitor the response to treatment.

Blood pressure targets

Clinic blood pressure

- People aged under 80 years: lower than 140/90 mmHg
- People aged over 80 years: lower than 150/90 mmHg

Daytime average ABPM or average HBPM blood pressure during the person's usual waking hours

- People aged under 80 years: lower than 135/85 mmHg
- People aged over 80 years: lower than 145/85 mmHg

Patient education and adherence to treatment

- Help people to make informed choices by providing guidance and materials about the benefits of drugs and the unwanted side effects sometimes experienced²⁴.
- Tell people about patient organisations that have forums for sharing views and information²⁴.
- Offer an annual review of care to monitor blood pressure, provide people with support and discuss their lifestyle, symptoms and medication²⁴.

Interventions to support adherence to treatment

- Only use interventions to overcome practical problems associated with non-adherence if a specific need is identified²⁵.
- Target the intervention to the need. Interventions might include:
 - suggesting that people record their medicine-taking
 - encouraging people to monitor their condition
 - simplifying the dosing regimen
 - using alternative packaging for the medicine
 - using a multi-compartment medicines system²⁵.

²³ A discrepancy of more than 20/10 mmHg between clinic and average daytime ABPM or average HBPM measurements at the time of diagnosis.

²⁴ This recommendation was developed for the original 2004 guideline.

²⁵ This recommendation is taken from 'Medicines adherence' (NICE clinical guideline 76, 2009), available from www.nice.org.uk/guidance/CG76

Further information

Related NICE guidance

For information about NICE guidance that has been issued or is in development, see www.nice.org.uk

Published

- Chronic heart failure. NICE clinical guideline 108 (2010). Available from www.nice.org.uk/guidance/CG108
- Hypertension in pregnancy. NICE clinical guideline 107 (2010). Available from www.nice.org.uk/guidance/CG107
- Prevention of cardiovascular disease at population level. NICE public health guidance 25 (2010). Available from www.nice.org.uk/guidance/PH25
- Type 2 diabetes. NICE clinical guideline 87 (2009). Available from www.nice.org.uk/guidance/CG87
- Medicines adherence. NICE clinical guideline 76 (2009). Available from www.nice.org.uk/guidance/CG76
- Chronic kidney disease. NICE clinical guideline 73 (2008). Available from www.nice.org.uk/guidance/CG73
- Stroke. NICE clinical guideline 68 (2008). Available from www.nice.org.uk/guidance/CG68
- Lipid modification. NICE clinical guideline 67 (2008). Available from www.nice.org.uk/guidance/CG67
- Continuous positive airway pressure for the treatment of obstructive sleep apnoea/hypopnoea syndrome. NICE technology appraisal guidance 139 (2008). Available from www.nice.org.uk/guidance/TA139

- MI: secondary prevention. NICE clinical guideline 48 (2007). Available from www.nice.org.uk/guidance/CG48
- Obesity. NICE clinical guideline 43 (2006). Available from www.nice.org.uk/guidance/CG43
- Atrial fibrillation. NICE clinical guideline 36 (2006). Available from www.nice.org.uk/guidance/CG36

Under development

- Patient experience in adult NHS services: improving the experience of care for people using adult NHS services. NICE clinical guideline. Publication expected October 2011.
- Percutaneous transluminal radiofrequency sympathetic denervation of the renal artery for resistant hypertension. NICE interventional procedure guidance. Publication expected Autumn 2011.

Updating the guideline

This guideline will be updated as needed, and information about the progress of any update will be available at

www.nice.org.uk/guidance/CG127

Ordering information

You can download the following documents from www.nice.org.uk/guidance/CG127

- The NICE guideline – all the recommendations.
- A quick reference guide (this document) – a summary of the recommendations for healthcare professionals.
- ‘Understanding NICE guidance’ – a summary for patients and carers.
- The full guideline – all the recommendations, details of how they were developed, and reviews of the evidence they were based on.

For printed copies of the quick reference guide or ‘Understanding NICE guidance’, phone NICE publications on 0845 003 7783 or email publications@nice.org.uk and quote:

- N2636 (quick reference guide)
- N2637 (‘Understanding NICE guidance’).

NICE pathway

The recommendations from this guideline have been incorporated into a NICE pathway, which is available from

<http://pathways.nice.org.uk/pathways/hypertension>

Implementation tools

NICE has developed tools to help organisations implement this guidance (see www.nice.org.uk/guidance/CG127).

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