NICE National Institute for Health and Care Excellence

NICE guideline

Hypertension in adults: diagnosis and management

NICE guideline
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Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the Yellow Card Scheme.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

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This guideline replaces CG127.

This guideline partially replaces NG28.

This guideline is the basis of QS181, QS28 and QS209.

Overview

This guideline covers identifying and treating primary hypertension (high blood pressure) in people aged 18 and over, including people with type 2 diabetes. It aims to reduce the risk of cardiovascular problems such as heart attacks and strokes by helping healthcare professionals to diagnose hypertension accurately and treat it effectively.

NICE has also produced a guideline on hypertension in pregnancy.

Who is it for?

- Healthcare professionals
- Commissioners and providers
- People who have or may have high blood pressure, their families and carers

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Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in NICE's information on making decisions about 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.

The recommendations on measuring blood pressure and diagnosing hypertension in this guideline apply to all adults, including those with type 2 diabetes. The recommendations on treatment and monitoring link to NICE's guidelines on chronic kidney disease, type 1 diabetes and hypertension in pregnancy at points in the care pathway where treatment differs. The recommendations on treatment and monitoring apply to adults with type 2 diabetes and replace recommendations on diagnosing and managing hypertension in NICE's guideline on type 2 diabetes in adults.

1.1 Measuring blood pressure

Training, technique and device maintenance

1.1.1 Ensure that healthcare professionals taking blood pressure measurements have adequate initial training and periodic review of their performance. **[2004]**

1.1.2 Because automated devices may not measure blood pressure accurately if there is pulse irregularity (for example, due to atrial fibrillation), palpate the radial or brachial pulse before measuring blood pressure. If pulse irregularity is present, measure blood pressure manually using direct auscultation over the brachial artery. **[2011]**

1.1.3 Healthcare providers must ensure that devices for measuring blood pressure are

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properly validated, maintained and regularly recalibrated according to manufacturers' instructions. See the British and Irish Hypertension Society's website for a list of validated blood pressure monitoring devices. **[2004]**

1.1.4 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. Use an appropriate cuff size for the person's arm. **[2011, amended 2019]**

Postural hypotension

1.1.5 In people with symptoms of postural hypotension, including falls or postural dizziness:

- measure blood pressure with the person lying on their back (or consider a seated position, if it is inconvenient to measure blood pressure with the person lying down)
- measure blood pressure again after the person has been standing for at least 1 minute. **[2004, amended 2023]**

1.1.6 If the person's systolic blood pressure falls by 20 mmHg or more, or their diastolic blood pressure falls by 10 mmHg or more, after the person has been standing for at least 1 minute:

- consider likely causes, including reviewing their current medication
- manage appropriately (for example, for advice on preventing falls in older people, see NICE's guideline on falls in older people: assessing risk and prevention)
- measure subsequent blood pressures with the person standing
- consider referral to specialist care if symptoms of postural hypotension persist despite addressing likely causes. **[2004, amended 2023]**

1.1.7 If the blood pressure drop is less than the thresholds in recommendation 1.1.6 despite suggestive symptoms and the baseline measurement was previously

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taken from a seated position, repeat the measurements this time starting with the person lying on their back. **[2023]**

1.1.8 Consider referring the person for further specialist assessment if blood pressure measurements do not confirm postural hypotension despite suggestive symptoms. **[2023]**

1.2 Diagnosing hypertension

1.2.1 When considering a diagnosis of hypertension, measure blood pressure in both arms:

- If the difference in readings between arms is more than 15 mmHg, repeat the measurements.
- If the difference in readings between arms remains more than 15 mmHg on the second measurement, measure subsequent blood pressures in the arm with the higher reading. **[2019]**

1.2.2 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 2 measurements as the clinic blood pressure. **[2019]**

1.2.3 If clinic blood pressure is between 140/90 mmHg and 180/120 mmHg, offer ambulatory blood pressure monitoring (ABPM) to confirm the diagnosis of hypertension. See the section on identifying who to refer for people with a clinic blood pressure 180/120 mmHg or higher. **[2019]**

1.2.4 If ABPM is unsuitable or the person is unable to tolerate it, offer home blood pressure monitoring (HBPM) to confirm the diagnosis of hypertension. **[2019]**

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1.2.5 While waiting for confirmation of a diagnosis of hypertension, carry out:

- investigations for target organ damage (see recommendation 1.3.3), **followed by**
- formal assessment of cardiovascular risk using a cardiovascular risk assessment tool (see the section on full formal risk assessment in NICE's guideline on cardiovascular disease). **[2019]**

1.2.6 When using ABPM to confirm a diagnosis of hypertension, ensure that at least 2 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. **[2011]**

1.2.7 When using HBPM to confirm a diagnosis of hypertension, ensure that:

- for each blood pressure recording, 2 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. **[2011]**

1.2.8 Confirm diagnosis of hypertension in people with a:

- clinic blood pressure of 140/90 mmHg or higher **and**
- ABPM daytime average or HBPM average of 135/85 mmHg or higher. **[2019]**

1.2.9 If hypertension is not diagnosed but there is evidence of target organ damage, consider carrying out investigations for alternative causes of the target organ damage (for information on investigations, see NICE's guidelines on chronic kidney disease and chronic heart failure). **[2011]**

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1.2.10 If hypertension is not diagnosed, measure the person's clinic blood pressure at least every 5 years subsequently, and consider measuring it more frequently if the person's clinic blood pressure is close to 140/90 mmHg. **[2011]**

Annual blood pressure measurement for people with type 2 diabetes

1.2.11 Measure blood pressure at least annually in an adult with type 2 diabetes without previously diagnosed hypertension or renal disease. Offer and reinforce preventive lifestyle advice. **[2009]**

Specialist investigations for possible secondary causes of hypertension

1.2.12 Consider the need for specialist investigations in people with signs and symptoms suggesting a secondary cause of hypertension. **[2004, amended 2011]**

For a short explanation of why the committee made the 2019 recommendations and how they might affect practice, see the rationale and impact section on diagnosing hypertension.

Full details of the evidence and the committee's discussion are in evidence review A: diagnosis.

1.3 Assessing cardiovascular risk and target organ damage

For guidance on the early identification and management of chronic kidney disease, see NICE's guideline on chronic kidney disease.

1.3.1 Use a formal estimation of cardiovascular risk to discuss prognosis and

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healthcare options with people with hypertension, both for raised blood pressure and other modifiable risk factors. **[2004]**

1.3.2 Estimate cardiovascular risk in line with the recommendations on identifying and assessing cardiovascular disease risk in NICE's guideline on cardiovascular disease. Use clinic blood pressure measurements to calculate cardiovascular risk. **[2008]**

1.3.3 For all people with hypertension offer to:

- 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 glycated haemoglobin (HbA1C), electrolytes, creatinine, estimated glomerular filtration rate, total cholesterol and HDL cholesterol
- examine the fundi for the presence of hypertensive retinopathy
- arrange for a 12-lead electrocardiograph to be performed. **[2011, amended 2019]**

1.4 Treating and monitoring hypertension

Lifestyle interventions

For guidance on the prevention of obesity and cardiovascular disease, see NICE's guidelines on obesity prevention and cardiovascular disease prevention.

1.4.1 Offer lifestyle advice to people with suspected or diagnosed hypertension, and continue to offer it periodically. **[2004]**

1.4.2 Ask about people's diet and exercise patterns because a healthy diet and regular exercise can reduce blood pressure. Offer appropriate guidance and written or audiovisual materials to promote lifestyle changes. **[2004]**

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1.4.3 Ask about people's alcohol consumption and encourage a reduced intake if they drink excessively, because this can reduce blood pressure and has broader health benefits. See the recommendations for practice in NICE's guideline on alcohol-use disorders. **[2004, amended 2019]**

1.4.4 Discourage excessive consumption of coffee and other caffeine-rich products. **[2004]**

1.4.5 Encourage people to keep their dietary sodium intake low, either by reducing or substituting sodium salt, as this can reduce blood pressure. Note that salt substitutes containing potassium chloride should not be used by older people, people with diabetes, pregnant women, people with kidney disease and people taking some antihypertensive drugs, such as ACE inhibitors and angiotensin II receptor blockers. Encourage salt reduction in these groups. **[2004, amended 2019]**

1.4.6 Do not offer calcium, magnesium or potassium supplements as a method for reducing blood pressure. **[2004]**

1.4.7 Offer advice and help to smokers to stop smoking. See NICE's guideline on tobacco. **[2004]**

1.4.8 Inform people about local initiatives by, for example, healthcare teams or patient organisations that provide support and promote healthy lifestyle change, especially those that include group work for motivating lifestyle change. **[2004]**

For a short explanation of why the committee deleted the recommendation on relaxation therapies and how this might affect practice, see the rationale and impact section on relaxation therapies.

Full details of the evidence and the committee's discussion are in evidence review H: relaxation therapies.

Starting antihypertensive drug treatment

NICE has produced a patient decision aid on treatment options for hypertension to help people and their healthcare professionals discuss the different types of treatment and

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make a decision that is right for each person.

For advice on shared decision making for medicines, see the information on patient decision aids in NICE's guideline on medicines optimisation.

To support adherence and ensure that people with hypertension make the most effective use of their medicines, see NICE's guideline on medicines adherence.

1.4.9 Offer antihypertensive drug treatment in addition to lifestyle advice to adults of any age with persistent stage 2 hypertension. Use clinical judgement for people of any age with frailty or multimorbidity (see also NICE's guideline on multimorbidity). **[2019]**

1.4.10 Discuss starting antihypertensive drug treatment, in addition to lifestyle advice, with adults aged under 80 with persistent stage 1 hypertension who have 1 or more of the following:

- target organ damage
- established cardiovascular disease
- renal disease
- diabetes
- an estimated 10-year risk of cardiovascular disease of 10% or more.

Use clinical judgement for people with frailty or multimorbidity (see also NICE's guideline on multimorbidity). **[2019]**

1.4.11 Discuss with the person their individual cardiovascular disease risk and their preferences for treatment, including no treatment, and explain the risks and benefits before starting antihypertensive drug treatment. Continue to offer lifestyle advice and support them to make lifestyle changes (see the section on lifestyle interventions), whether or not they choose to start antihypertensive drug treatment. **[2019]**

1.4.12 Consider antihypertensive drug treatment in addition to lifestyle advice for adults aged under 60 with stage 1 hypertension and an estimated 10-year risk below

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10%. Bear in mind that 10-year cardiovascular risk may underestimate the lifetime probability of developing cardiovascular disease. **[2019]**

1.4.13 Consider antihypertensive drug treatment in addition to lifestyle advice for people aged over 80 with stage 1 hypertension if their clinic blood pressure is over 150/90 mmHg. Use clinical judgement for people with frailty or multimorbidity (see also NICE's guideline on multimorbidity). **[2019]**

1.4.14 For adults aged under 40 with hypertension, consider seeking specialist evaluation of secondary causes of hypertension and a more detailed assessment of the long-term balance of treatment benefit and risks. **[2019]**

For a short explanation of why the committee made the 2019 recommendations and how they might affect practice, see the rationale and impact section on starting antihypertensive drug treatment.

Full details of the evidence and the committee's discussion are in evidence review C: initiating treatment.

Monitoring treatment and blood pressure targets

For specific recommendations on blood pressure control in people with other conditions or who are pregnant, see NICE's guidelines on chronic kidney disease, type 1 diabetes and hypertension in pregnancy.

See also table 1 for clinic blood pressure targets for people aged under 80 and table 2 for clinic blood pressure targets for people aged 80 and over. The tables cover people with hypertension (with or without type 2 diabetes) as well as people with chronic kidney disease or type 1 diabetes.

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Table 1: Clinic blood pressure targets for people aged under 80

Person under 80 with:	Clinic blood pressure target	Source
• hypertension (with or without type 2 diabetes) **or** • type 1 diabetes plus albumin to creatinine ratio less than 70 mg/mmol **or** • chronic kidney disease plus albumin to creatinine ratio less than 70 mg/mmol	Below 140/90	Recommendation 1.4.20 NICE's guideline on type 1 diabetes in adults (recommendation 1.13.8) NICE's guideline on chronic kidney disease (recommendation 1.6.1)
• type 1 diabetes plus albumin to creatinine ratio of 70 mg/mmol or more **or** • chronic kidney disease plus albumin to creatinine ratio of 70 mg/mmol or more	Below 130/80	NICE's guideline on type 1 diabetes in adults (recommendation 1.13.8) NICE's guideline on chronic kidney disease (recommendation 1.6.2)

Table 2: Clinic blood pressure targets for people aged 80 and over

Person aged 80 and over with:	Clinic blood pressure target	Source
• hypertension (with or without type 2 diabetes) **or** • type 1 diabetes (regardless of albumin to creatinine ratio)	Below 150/90	Recommendation 1.4.21 NICE's guideline on type 1 diabetes in adults (recommendation 1.13.8)
• chronic kidney disease plus albumin to creatinine ratio less than 70 mg/mmol	Below 140/90	NICE's guideline on chronic kidney disease (recommendation 1.6.1)

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• chronic kidney disease plus albumin to creatinine ratio of 70 mg/mmol or more	Below 130/80	NICE's guideline on chronic kidney disease (recommendation 1.6.2)

1.4.15 Use clinic blood pressure measurements to monitor the response to lifestyle changes or drug treatment in people with hypertension. **[2019]**

1.4.16 Check for postural hypotension (see recommendation 1.1.5) in people with hypertension and:

- type 2 diabetes **or**
- symptoms of postural hypotension (see also recommendation 1.1.7) **or**
- aged 80 and over.

In people with a significant postural drop or symptoms of postural hypotension, treat to a blood pressure target based on standing blood pressure. **[2019, amended 2023]**

1.4.17 Advise people with hypertension who choose to self-monitor their blood pressure to use HBPM. (NHS England is supporting the use of HBPM through the blood pressure@home scheme.) **[2019]**

1.4.18 Consider ABPM or HBPM, in addition to clinic blood pressure measurements, for people with hypertension identified as having a white-coat effect or masked hypertension (in which clinic and non-clinic blood pressure results are conflicting). Be aware that the corresponding measurements for ABPM and HBPM are 5 mmHg lower than for clinic measurements (see recommendation 1.2.8 for diagnostic thresholds). **[2019]**

1.4.19 For people who choose to use HBPM, provide:

- training and advice on using home blood pressure monitors
- information about what to do if they are not achieving their target blood pressure.

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Be aware that the corresponding measurements for HBPM are 5 mmHg lower than for clinic measurements (see recommendation 1.2.8 for diagnostic thresholds). **[2019]**

1.4.20 For adults with hypertension aged under 80, reduce clinic blood pressure to below 140/90 mmHg and ensure that it is maintained below that level. See also table 1 for guidance on clinic blood pressure targets for people aged under 80 with type 1 diabetes or severe chronic kidney disease. **[2019, amended 2022]**

1.4.21 For adults with hypertension aged 80 and over, reduce clinic blood pressure to below 150/90 mmHg and ensure that it is maintained below that level. Use clinical judgement for people with frailty or multimorbidity (see NICE's guideline on multimorbidity). See also table 2 for guidance on clinic blood pressure targets for people aged 80 and over with type 1 diabetes or severe chronic kidney disease. **[2019, amended 2022]**

1.4.22 When using ABPM or HBPM to monitor the response to treatment in adults with hypertension, use the average blood pressure level taken during the person's usual waking hours (see recommendations 1.2.6 and 1.2.7). Reduce blood pressure and ensure that it is maintained:

- below 135/85 mmHg for adults aged under 80
- below 145/85 mmHg for adults aged 80 and over.

Use clinical judgement for people with frailty or multimorbidity (see also NICE's guideline on multimorbidity). **[2019, amended 2022]**

For a short explanation of why the committee made the 2019 recommendations and how they might affect practice, see the rationale and impact section on monitoring treatment and blood pressure targets for people without cardiovascular disease.

Full details of the evidence and the committee's discussion are in evidence review B: monitoring the response to treatment.

1.4.23 Use the same blood pressure targets for people with and without cardiovascular

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disease. **[2022]**

For a short explanation of why the committee made the recommendation on blood pressure targets for people with cardiovascular disease and how this might affect practice, see the rationale and impact section on monitoring treatment and blood pressure targets for people with cardiovascular disease.

Full details of the evidence and the committee's discussion are in the evidence review J: blood pressure targets.

1.4.24 Provide an annual review of care for adults with hypertension to monitor blood pressure, provide people with support, and discuss their lifestyle, symptoms and medication. **[2004]**

Treatment review when type 2 diabetes is diagnosed

1.4.25 For an adult with type 2 diabetes on antihypertensive drug treatment when diabetes is diagnosed, review blood pressure control and medications used. Make changes only if there is poor control or if current drug treatment is not appropriate because of microvascular complications or metabolic problems. **[2009]**

Choosing antihypertensive drug treatment (for people with or without type 2 diabetes)

The recommendations in this section apply to people with hypertension with or without type 2 diabetes. They replace the recommendations on diagnosing and managing hypertension in NICE's guideline on type 2 diabetes in adults. For guidance on choosing antihypertensive drug treatment in people with type 1 diabetes, see also the section on control of cardiovascular risk in NICE's guideline on type 1 diabetes.

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Note that ACE inhibitors and angiotensin II receptor antagonists should not be used in pregnant or breastfeeding women or women planning pregnancy unless absolutely necessary, in which case the potential risks and benefits should be discussed. Follow the MHRA safety advice on ACE inhibitors and angiotensin II receptor antagonists: not for use in pregnancy, recommendations on how to use for breastfeeding and the related clarification on breastfeeding.

1.4.26 For guidance on choice of antihypertensive medicine in people with chronic kidney disease, see NICE's guideline on chronic kidney disease. If possible, offer treatment with drugs taken only once a day. **[2004]**

1.4.27 Prescribe non-proprietary drugs if these are appropriate and minimise cost. **[2004]**

1.4.28 Offer people with isolated systolic hypertension (systolic blood pressure 160 mmHg or more) the same treatment as people with both raised systolic and diastolic blood pressure. **[2004]**

1.4.29 Offer antihypertensive drug treatment to women of childbearing potential with diagnosed hypertension in line with the recommendations in this guideline. For women considering pregnancy or who are pregnant or breastfeeding, manage hypertension in line with the recommendations on management of pregnancy with chronic hypertension, and on antihypertensive treatment while breastfeeding in NICE's guideline on hypertension in pregnancy. **[2010, amended 2019]**

1.4.30 When choosing antihypertensive drug treatment for adults of Black African or African–Caribbean family origin, consider an angiotensin II receptor blocker (ARB), in preference to an angiotensin-converting enzyme (ACE) inhibitor. **[2019]**

Follow the MHRA safety advice on ACE inhibitors and angiotensin II receptor antagonists: not for use in pregnancy, how to use for breastfeeding and clarification on breastfeeding.

1.4.31 For people with cardiovascular disease:

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- Follow the recommendations for disease-specific indications in the NICE guideline on their condition (for example, when prescribing an ACE inhibitor or an ARB for secondary prevention of myocardial infarction). Relevant recommendations include:
  - drug therapy for secondary prevention in NICE's guideline on acute coronary syndromes
  - treatment after stabilisation in NICE's guideline on acute heart failure
  - treating heart failure with reduced ejection fraction in NICE's guideline on chronic heart failure
  - drugs for secondary prevention of cardiovascular disease in NICE's guideline on stable angina
  - blood pressure management in NICE's guideline on type 1 diabetes in adults.
- If their blood pressure remains uncontrolled, offer antihypertensive drug treatment in line with the recommendations in this section. **[2022]**

For a short explanation of why the committee made the recommendation on choosing antihypertensive drug treatment for people with cardiovascular disease and how this might affect practice, see the rationale and impact section on choosing antihypertensive drug treatment for people with cardiovascular disease.

Full details of the evidence and the committee's discussion are in the evidence review K: pharmacological treatment in cardiovascular disease.

Step 1 treatment

1.4.32 Offer an ACE inhibitor or an ARB to adults starting step 1 antihypertensive treatment who:

- have type 2 diabetes and are of any age or family origin (see also recommendation 1.4.30 for adults of Black African or African–Caribbean family origin) **or**

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- are aged under 55 but not of Black African or African–Caribbean family origin. **[2019]**

  Follow the MHRA safety advice on ACE inhibitors and angiotensin II receptor antagonists: not for use in pregnancy, how to use for breastfeeding and clarification on breastfeeding.

1.4.33 If an ACE inhibitor is not tolerated, for example because of cough, offer an ARB to treat hypertension. **[2019]**

Follow the MHRA safety advice on ACE inhibitors and angiotensin II receptor antagonists: not for use in pregnancy, how to use for breastfeeding and clarification on breastfeeding.

1.4.34 Do not combine an ACE inhibitor with an ARB to treat hypertension. **[2019]**

1.4.35 Offer a calcium-channel blocker (CCB) to adults starting step 1 antihypertensive treatment who:

- are aged 55 or over and do not have type 2 diabetes **or**
- are of Black African or African–Caribbean family origin and do not have type 2 diabetes (of any age). **[2019]**

1.4.36 If a CCB is not tolerated, for example because of oedema, offer a thiazide-like diuretic to treat hypertension. **[2019]**

1.4.37 If there is evidence of heart failure, offer a thiazide-like diuretic and follow NICE's guideline on chronic heart failure. **[2019]**

1.4.38 If starting or changing diuretic treatment for hypertension, offer a thiazide-like diuretic, such as indapamide in preference to a conventional thiazide diuretic such as bendroflumethiazide or hydrochlorothiazide. **[2019]**

1.4.39 For adults with hypertension already having treatment with bendroflumethiazide or hydrochlorothiazide, who have stable, well-controlled blood pressure, continue with their current treatment. **[2019]**

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For a short explanation of why the committee made the 2019 recommendations and how they might affect practice, see the rationale and impact section on step 1 treatment.

Full details of the evidence and the committee's discussion are in evidence review E: step 1 treatment.

Step 2 treatment

1.4.40 Before considering next step treatment for hypertension discuss with the person if they are taking their medicine as prescribed and support adherence in line with NICE's guideline on medicines adherence. **[2019]**

1.4.41 If hypertension is not controlled in adults taking step 1 treatment of an ACE inhibitor or ARB, offer the choice of 1 of the following drugs in addition to step 1 treatment:

- a CCB **or**
- a thiazide-like diuretic. **[2019]**

1.4.42 If hypertension is not controlled in adults taking step 1 treatment of a CCB, offer the choice of 1 of the following drugs in addition to step 1 treatment:

- an ACE inhibitor **or**
- an ARB **or**
- a thiazide-like diuretic. **[2019]**

1.4.43 If hypertension is not controlled in adults of Black African or African–Caribbean family origin who do not have type 2 diabetes taking step 1 treatment, consider an ARB, in preference to an ACE inhibitor, in addition to step 1 treatment. **[2019]**

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Step 3 treatment

1.4.44 Before considering next step treatment for hypertension:

- review the person's medications to ensure they are being taken at the optimal tolerated doses **and**
- discuss adherence (see recommendation 1.4.40). **[2019]**

1.4.45 If hypertension is not controlled in adults taking step 2 treatment, offer a combination of:

- an ACE inhibitor or ARB (see also recommendation 1.4.30 for people of Black African or African–Caribbean family origin) **and**
- a CCB **and**
- a thiazide-like diuretic. **[2019]**

For a short explanation of why the committee made the 2019 recommendations and how they might affect practice, see the rationale and impact section on step 2 and 3 treatment.

Full details of the evidence and the committee's discussion are in evidence review F: step 2 and step 3 treatment.

Step 4 treatment

1.4.46 If hypertension is not controlled in adults taking the optimal tolerated doses of an ACE inhibitor or an ARB plus a CCB and a thiazide-like diuretic, regard them as having resistant hypertension. **[2019]**

1.4.47 Before considering further treatment for a person with resistant hypertension:

- Confirm elevated clinic blood pressure measurements using ambulatory or home blood pressure recordings.
- Assess for postural hypotension.

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- Discuss adherence (see recommendation 1.4.40). **[2019]**

1.4.48 For people with confirmed resistant hypertension, consider adding a fourth antihypertensive drug as step 4 treatment or seeking specialist advice. **[2019]**

Follow the MHRA safety advice on ACE inhibitors and angiotensin II receptor antagonists: not for use in pregnancy, how to use for breastfeeding and clarification on breastfeeding.

1.4.49 Consider further diuretic therapy with low-dose spironolactone for adults with resistant hypertension starting step 4 treatment who have a blood potassium level of 4.5 mmol/l or less. Use particular caution in people with a reduced estimated glomerular filtration rate because they have an increased risk of hyperkalaemia. **[2019]**

In March 2019, this was an off-label use of some preparations of spironolactone. See NICE's information on prescribing medicines.

1.4.50 When using further diuretic therapy for step 4 treatment of resistant hypertension, monitor blood sodium and potassium and renal function within 1 month of starting treatment and repeat as needed thereafter. **[2019]**

1.4.51 Consider an alpha-blocker or beta-blocker for adults with resistant hypertension starting step 4 treatment who have a blood potassium level of more than 4.5 mmol/l. **[2019]**

1.4.52 If blood pressure remains uncontrolled in people with resistant hypertension taking the optimal tolerated doses of 4 drugs, seek specialist advice. **[2019]**

For a short explanation of why the committee made the 2019 recommendations and how they might affect practice, see the rationale and impact section on step 4 treatment.

Full details of the evidence and the committee's discussion are in evidence review G: step 4 treatment.

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1.5 Identifying who to refer for same-day specialist review

1.5.1 If a person has severe hypertension (clinic blood pressure of 180/120 mmHg or higher), but no symptoms or signs indicating same-day referral (see recommendation 1.5.2), carry out investigations for target organ damage (see recommendation 1.3.3) as soon as possible:

- If target organ damage is identified, consider starting antihypertensive drug treatment immediately, without waiting for the results of ABPM or HBPM.
- If no target organ damage is identified, confirm diagnosis by:
  - repeating clinic blood pressure measurement within 7 days, **or**
  - considering monitoring using ABPM (or HBPM if ABPM is not suitable or not tolerated), following recommendations 1.2.6 and 1.2.7, and ensuring a clinical review within 7 days. **[2019]**

1.5.2 Refer people for specialist assessment, carried out on the same day, if they have a clinic blood pressure of 180/120 mmHg and higher with:

- signs of retinal haemorrhage or papilloedema (accelerated hypertension) **or**
- life-threatening symptoms such as new onset confusion, chest pain, signs of heart failure, or acute kidney injury. **[2019]**

1.5.3 Refer people for specialist assessment, carried out on the same day, if they have suspected phaeochromocytoma (for example, labile or postural hypotension, headache, palpitations, pallor, abdominal pain or diaphoresis). **[2019]**

For a short explanation of why the committee made the 2019 recommendations and how they might affect practice, see the rationale and impact section on identifying who to refer for same-day specialist review.

Full details of the evidence and the committee's discussion are in evidence review I: same-day specialist review.

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Terms used in this guideline

This section defines terms that have been used in a particular way for this guideline. For other definitions see the NICE glossary.

Accelerated hypertension

A severe increase in blood pressure to 180/120 mmHg or higher (and often over 220/120 mmHg) with signs of retinal haemorrhage and/or papilloedema (swelling of the optic nerve). It is usually associated with new or progressive target organ damage and is also known as malignant hypertension.

Established cardiovascular disease

Medical history of ischaemic heart disease, cerebrovascular disease, peripheral vascular disease, aortic aneurysm or heart failure. Cardiovascular disease is a general term for conditions affecting the heart or blood vessels. It is usually associated with a build-up of fatty deposits inside the arteries (atherosclerosis) and an increased risk of blood clots. It can also be associated with damage to arteries in organs such as the brain, heart, kidneys and eyes through deposition of glassy material within the artery walls (arteriosclerosis). Cardiovascular disease is 1 of the main causes of death and disability in the UK, but it can often largely be prevented by leading a healthy lifestyle.

Masked hypertension

Clinic blood pressure measurements are normal (less than 140/90 mmHg), but blood pressure measurements are higher when taken outside the clinic using average daytime ambulatory blood pressure monitoring (ABPM) or average home blood pressure monitoring (HBPM) blood pressure measurements.

Persistent hypertension

High blood pressure at repeated clinical encounters.

Stage 1 hypertension

Clinic blood pressure ranging from 140/90 mmHg to 159/99 mmHg and subsequent ABPM

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daytime average or HBPM average blood pressure ranging from 135/85 mmHg to 149/94 mmHg.

Stage 2 hypertension

Clinic blood pressure of 160/100 mmHg or higher but less than 180/120 mmHg and subsequent ABPM daytime average or HBPM average blood pressure of 150/95 mmHg or higher.

Stage 3 or severe hypertension

Clinic systolic blood pressure of 180 mmHg or higher or clinic diastolic blood pressure of 120 mmHg or higher.

Target organ damage

Damage to organs such as the heart, brain, kidneys and eyes. Examples are left ventricular hypertrophy, chronic kidney disease, hypertensive retinopathy or increased urine albumin:creatinine ratio.

White-coat effect

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.

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Recommendations for research

The 2019 and 2022 guideline committees have made the following recommendations for research.

Key recommendations for research

1 Automated blood pressure monitoring in people with atrial fibrillation

Which automated blood pressure monitors are suitable for people with hypertension and atrial fibrillation? **[2019]**

For a short explanation of why the committee made the recommendation for research, see the rationale on monitoring treatment and blood pressure targets for people without cardiovascular disease.

Full details of the evidence and the committee's discussion are in evidence review B: monitoring the response to treatment.

2 Thresholds for interventions in adults aged under 40

In adults aged under 40 with hypertension (with or without type 2 diabetes), what are the appropriate risk and blood pressure thresholds for starting treatment? **[2019]**

For a short explanation of why the committee made the recommendation for research, see the rationale on starting antihypertensive drug treatment.

Full details of the evidence and the committee's discussion are in evidence review C: initiating treatment.

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3 Blood pressure targets for people aged over 80

What is the optimum blood pressure target for people aged over 80 with treated primary hypertension (with or without cardiovascular disease)? **[2022]**

For a short explanation of why the committee made the recommendation for research, see the rationale on blood pressure targets for people with cardiovascular disease.

Full details of the evidence and the committee's discussion are in evidence review D: targets.

4 Step 1 treatment

Are there subgroups of people with hypertension who should start on dual therapy? **[2019]**

For a short explanation of why the committee made the recommendation for research, see the rationale on step 1 treatment.

Full details of the evidence and the committee's discussion are in evidence review E: step 1 treatment.

5 Relaxation therapies

What is the clinical and cost effectiveness of relaxation therapies for managing primary hypertension in adults in terms of reducing cardiovascular events and improving quality of life? **[2019]**

For a short explanation of why the committee made the recommendation for research, see the rationale on relaxation therapies.

Full details of the evidence and the committee's discussion are in evidence review H: relaxation therapies.

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Other recommendations for research

6 Same-day hospital specialist assessment

Which people with extreme hypertension (220/120 mmHg or higher) or emergency symptoms should be referred for same-day hospital specialist assessment? **[2019]**

For a short explanation of why the committee made the recommendation for research, see the see rationale on identifying who to refer for same-day specialist review.

Full details of the evidence and the committee's discussion are in evidence review I: same-day specialist review.

7 Blood pressure targets for people with aortic aneurysm

What are the optimal blood pressure targets in adults with hypertension and aortic aneurysm, and does this vary by age? **[2022]**

For a short explanation of why the committee made the recommendation for research, see the rationale and impact section on blood pressure targets for people with cardiovascular disease.

Full details of the evidence and the committee's discussion are in the evidence review J: blood pressure targets.

8 Blood pressure targets for people with prior ischaemic or haemorrhagic stroke

What are the optimal blood pressure targets in adults with prior ischaemic or haemorrhagic stroke, and does this vary by age? **[2022]**

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For a short explanation of why the committee made the recommendation for research, see the rationale and impact section on blood pressure targets for people with cardiovascular disease.

Full details of the evidence and the committee's discussion are in the evidence review J: blood pressure targets.

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Rationale and impact

These sections briefly explain why the committee made the recommendations and how they might affect practice. They link to details of the evidence and a full description of the committee's discussion.

Diagnosing hypertension

Recommendations 1.2.1 to 1.2.5 and 1.2.8

Why the committee made the recommendations

Overall, there was limited new evidence on the accuracy of different methods of measuring blood pressure. Most of the studies identified were small, and the populations and protocols for measurement varied making interpretation difficult. However, the committee agreed that it was important to focus on the evidence from these more recent studies (post-2000) because the evidence should reflect the current use of electronic sphygmomanometers, which have replaced mercury-based sphygmomanometers.

The evidence did not show that changing the current blood pressure thresholds for clinic measurement or home blood pressure monitoring (HBPM) would improve diagnostic accuracy compared with ambulatory blood pressure monitoring (ABPM), so the committee agreed the 2011 thresholds for diagnosis should be retained. The committee noted that these are in line with most international guidance.

Limited evidence suggested that clinic blood pressure measurement is less accurate than HBPM or ABPM when used to diagnose hypertension. The committee members acknowledged that these findings were in line with their clinical experience and agreed that clinic blood pressure measurement alone would not be an adequate method to diagnose hypertension.

The committee discussed repeat clinic blood pressure measurements when there is a difference in blood pressure between arms and noted that clinical practice varied. Based on their experience and knowledge, the committee members agreed that a cut-off of 15 mmHg would be more suitable than 20 mmHg, which was specified in the 2011 recommendations. This is in line with recent evidence that suggests a small difference in

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arm blood pressure is associated with an increased risk of cardiovascular events, possibly due to vascular damage.

ABPM correlates well with invasive blood pressure measurement and can identify both white-coat and masked hypertension. Based on the evidence in the 2011 guideline and the committee's experience and knowledge, it was agreed that ABPM remains the gold standard for the accurate measurement of blood pressure in primary care. ABPM has therefore been retained as the preferred method for the diagnosis of hypertension. In addition, economic evidence obtained by updating the health economic model for the 2011 guideline confirmed that ABPM is still likely to be the most cost-effective method for diagnosis, even with the inclusion of new data for improved accuracy of home and clinic measurement.

The evidence showed that validated HBPM is an accurate method of diagnosing hypertension for people in sinus rhythm. The committee's experience in clinical practice supported this, and the committee agreed that it is a suitable alternative when ABPM is unsuitable or not tolerated. The committee noted that the British and Irish Hypertension Society maintains a list of validated blood pressure devices for home use. The British and Irish Hypertension Society is an independent reviewer of published work and this does not imply any endorsement of specific devices by NICE.

The evidence did not suggest that there were any benefits of adding telemonitoring to HBPM. Therefore, the committee agreed that it could not make a recommendation on telemonitoring for the diagnosis of hypertension.

How the recommendations might affect practice

The recommendations reinforce current good practice. However, the committee noted that implementation of the 2011 recommendations on ABPM has been challenging and that there is still variation in practice. A change in practice and additional resources and training will be needed in areas where there is currently no access to ABPM devices. However, ABPM was found to be the most cost-effective method of diagnosis, and it is anticipated that the long-term benefits of accurate diagnosis and treatment (such as avoiding over diagnosis and unnecessary treatment) will outweigh any initial costs.

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Relaxation therapies

Why the committee deleted the recommendation on relaxation therapies

The evidence on relaxation therapies was limited to a single small study. The study suggested some benefit in reducing angina and myocardial infarction, but it also suggested an increase in stroke. The committee agreed that the study was not adequate to assess the effectiveness of these therapies or to make a recommendation.

The 2011 guideline stated that relaxation therapies could reduce blood pressure, but it did not recommend their routine use in practice. The committee noted that this was based on evidence for reducing blood pressure only, and there was no evidence of a direct benefit to people with hypertension, such as improving quality of life or reducing cardiovascular events. The committee agreed there was insufficient evidence of benefit to recommend that people pursue this option themselves and agreed to remove this recommendation. It is not the intention of the committee to stop people from trying relaxation therapies if they wish to, but to make people aware that there is less evidence for benefit of this intervention compared with other lifestyle interventions or pharmacological treatment. The committee agreed that the clinical focus for non-pharmacological treatment of hypertension should be on encouraging people to make lifestyle changes, such as taking regular exercise and maintaining a healthy weight.

The committee agreed that further research would be useful to determine whether relaxation therapies are a clinically effective treatment for hypertension in terms of reducing cardiovascular events or improving quality of life (see the recommendation for research on relaxation therapies). They also noted that a larger study would be needed to obtain meaningful results.

How this might affect practice

Relaxation therapies were not recommended for routine use in the 2011 guideline, and they are not used in current practice for the management of primary hypertension in adults. The 2011 recommendation advised that people may try them as part of their treatment to reduce blood pressure, but committee consensus was that uptake has been low. Therefore, current practice will not be affected by the removal of the 2011 recommendation.

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Starting antihypertensive drug treatment

Recommendations 1.4.9 to 1.4.14

Why the committee made the recommendations

The evidence suggested that antihypertensive drug treatment was effective at reducing cardiovascular events in people with a clinic blood pressure of 160/100 mmHg or more (stage 2 hypertension).

A large study also suggested there was benefit of treating people with stage 1 hypertension. However, other studies in people with a low cardiovascular risk did not identify a benefit of treatment, and the committee agreed that the benefit of treatment across different cardiovascular risk groups was uncertain. The evidence was used to develop an economic model to compare the cost effectiveness of antihypertensive treatment with no treatment in people with stage 1 hypertension at different levels of cardiovascular risk. For people aged 60, the model showed that treatment was cost effective at a 10-year cardiovascular risk level of 10%, but there was some uncertainty at around 5% risk. Further analysis showed that it was cost effective to offer antihypertensive treatment to people aged 40 and 50 with stage 1 hypertension at a 5% risk and aged 70 and 75 at a 10% or 15% risk. QRISK was specified as the risk tool because it is recommended by NICE for risk calculation and most likely to be used in practice.

Taking into account the evidence and the results of the model, the committee were confident that people under 80 with stage 1 hypertension and a cardiovascular risk above 10% should have a discussion with their healthcare professional about starting antihypertensive treatment, alongside lifestyle changes, and that this would be a clinically and cost-effective use of NHS resources. The committee also agreed that antihypertensive treatment should be considered for people under 60 with a risk below 10%, with the degree of uncertainty in treating people at low risk reflected in the strength of the recommendation.

The committee members were mindful of the additional population that would be affected by lowering the threshold and were aware that the decision to start drug treatment would depend on the person's preferences and their individual risk of cardiovascular disease. The recommendations highlight the importance of discussing the person's preferences for treatment and encouraging lifestyle changes.

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Some studies investigated the benefits of treating hypertension in people with lower cardiovascular risk or people with blood pressure below 140/90 mmHg. However, some of these studies were not directly relevant because they included a high proportion of participants with chronic kidney disease and previous cardiovascular events. For this reason, several studies could not be used to inform the recommendations. For details of these studies see evidence review C: initiating treatment.

The committee discussed the lack of evidence to inform a threshold for starting treatment in people aged under 40. It was agreed that this is an important area for future research and the recommendation for research was carried forward from the 2011 guideline (see the recommendation for research on thresholds for interventions in adults aged under 40).

The committee agreed that there was no evidence to suggest that thresholds for starting treatment should be different in people with type 2 diabetes. The previous recommendations for people with type 2 diabetes (in NICE's guideline on type 2 diabetes in adults) suggested starting antihypertensive drug treatment if lifestyle interventions alone did not reduce blood pressure to below 140/80 mmHg or 130/80 mmHg in the presence of kidney, cerebrovascular or eye disease. However, this was based on evidence from 2 small studies in which the participants did not have hypertension. Further evidence for lower treatment thresholds in people with type 2 diabetes was limited within this review, with the committee aware of some evidence to suggest that lower blood pressure thresholds did not reduce the rate of cardiovascular events in people without additional risk factors. The committee therefore agreed that there was insufficient evidence to recommend a different threshold for starting treatment for this subgroup.

There was no evidence identified on thresholds for people aged over 80, and no prior recommendation for this age group with hypertension below stage 2; therefore, the committee agreed that the threshold for starting treatment in people aged over 80 should be consistent with the target for treatment in this population (150/90 mmHg or lower).

The committee discussed the additional risks of starting treatment in older people, particularly those who are frail or have multiple comorbidities. Based on their expertise and experience, they agreed that the use of clinical judgement should be highlighted in decision making for people with frailty or multimorbidity, and that it should apply to people of any age. The committee agreed that a number of factors should be considered when discussing treatment options in this group and noted that healthcare professionals should refer to NICE's guideline on multimorbidity for further advice.

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How the recommendations might affect practice

The recommendations will have a significant impact on practice because more people will now be eligible for treatment. It is difficult to predict the extent of the impact because there is variability in how the 2011 recommendation with a threshold of 20% is being implemented in practice. However, it is believed, based on some recently published UK data, that potentially around 50% of people with stage 1 hypertension and risk below 20% are already being treated with antihypertensive drugs (Association of guideline and policy changes with incidence of lifestyle advice and treatment for uncomplicated mild hypertension in primary care. Sheppard et al. 2018).

People with stage 1 hypertension should already be monitored every year, but reducing the threshold will increase the number of people being prescribed antihypertensive drugs and increase staff time and consultations involved in starting and monitoring their drug treatment. However, there will be a reduction in cardiovascular events resulting in savings, although it is acknowledged that the costs and savings may fall in different sectors of the NHS.

Return to recommendations

Monitoring treatment and blood pressure targets

Recommendations 1.4.15 to 1.4.22

Monitoring treatment

Why the committee made the recommendations

The committee agreed that there was not enough evidence to strongly recommend home blood pressure monitoring (HBPM) for monitoring treatment in adults with hypertension. The evidence on monitoring was limited, with relatively small studies comparing different combinations of HBPM (with or without telemonitoring and with or without pharmacist input), pharmacy monitoring and clinic monitoring. It suggested that people had improved blood pressure control with HBPM with telemonitoring, with or without pharmacy input, compared with clinic monitoring, and the greatest blood pressure reduction was achieved with pharmacist input. However, the evidence was insufficient for the committee to make a recommendation.

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The committee decided to retain the 2011 recommendation on using clinic blood pressure, but also agreed that the updated guideline should support home monitoring for people who wish to use it. The committee discussed the importance of patient choice and agreed that home monitoring should be an option, if it is suitable and the person is willing and motivated to use it. HBPM is already widely used in practice, especially for people with a white-coat effect. The committee agreed this would be reflected in the recommendation supported by the evidence and consensus opinion. Based on their experience, the committee agreed that training and advice would be needed for people using HBPM to ensure that people take measurements correctly and know when to contact their healthcare professional if they are not achieving their target blood pressure.

The 2011 guideline included a recommendation for further research for the best method of monitoring hypertension in people with atrial fibrillation. No evidence was identified in the updated reviews to inform recommendations for this group and therefore the committee agreed that this recommendation for research should be retained to inform future updates of the guideline (see the recommendation for research on automated blood pressure monitoring).

The committee agreed they could not make a recommendation on telemonitoring because the evidence was not sufficient to show a clear benefit and the studies were inconsistent in the telemonitoring methods used.

How the recommendations might affect practice

The recommendations reflect current practice, so there should be no change in practice. They will encourage appropriate and suitable training to be given so that both people with hypertension and their healthcare professionals are confident that blood pressure is being measured properly using home monitoring devices.

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Blood pressure targets for people without cardiovascular disease

Recommendations 1.4.15 to 1.4.22

Why the committee made the recommendations

No evidence was identified to determine whether cardiovascular risk or blood pressure

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targets should be used. The committee agreed that in the absence of evidence the focus should be on blood pressure targets, based on their expertise and experience of current practice.

The evidence for blood pressure targets showed that there were both benefits and harms associated with a lower clinic systolic blood pressure target of 120 mmHg compared with 140 mmHg in people with primary hypertension without type 2 diabetes. Although the evidence suggested some benefit in reducing mortality and cardiovascular events, the lower blood pressure target was associated with a greater risk of harms, such as injury from falls and acute kidney injury. The committee agreed that the long-term implications of these adverse events were unclear and that further research is needed.

This evidence came from the SPRINT trial, which was a large study undertaken in the US. The committee discussed concerns about the population included in the study and the applicability to UK practice of the methods used. The study used automated blood pressure devices with a time delay and an isolated rest period, which is not common practice in the UK. The committee considered that the use of these devices would lead to lower blood pressure readings than in routine UK clinical practice. They also had concerns that some medicines were stopped when blood pressure targets were achieved, which may have had an impact on the results. The committee also discussed concerns about applicability of the population; for example, the participants had high cardiovascular risk levels, including many with pre-existing cardiovascular disease or renal impairment, and were already receiving treatment before the study started. These concerns made the evidence difficult to interpret and use to inform the recommendations. Further details of the committee's discussion of this study is included in evidence review D: targets.

Evidence from a smaller study also showed some benefit of lowering clinic systolic blood pressure targets to 130 mmHg. However, the committee noted that the study was based on people already receiving treatment and that it lacked information on adverse events.

The committee agreed that there was no evidence to suggest that blood pressure targets should be different in people with type 2 diabetes. Evidence for lower targets in people with type 2 diabetes was also limited, with some evidence to suggest that lower blood pressure targets did not reduce the rate of cardiovascular events. Previous recommendations for people with type 2 diabetes (in NICE's guideline on type 2 diabetes in adults) suggested a blood pressure target below 130/80 mmHg in the presence of target organ damage such as kidney, cerebrovascular or eye disease. The committee noted that the evidence behind this recommendation was based on 2 small studies in

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people without hypertension. They also had concerns about the relevance of the study design. The committee were also aware of trial data showing less benefit in populations with type 2 diabetes with fewer additional risk factors. The committee therefore agreed that there was insufficient evidence to recommend a different blood pressure target for this subgroup. It was noted that people with later-stage chronic kidney disease are covered by other NICE guidelines.

Overall, the committee agreed that the evidence was unclear and insufficient to determine whether a lower target would be beneficial and whether it would outweigh the associated harms. Therefore, the 2011 clinic blood pressure target of 140/90 mmHg for adults under 80 years was retained and applies to people with or without type 2 diabetes. The corresponding HBPM and ambulatory blood pressure monitoring (ABPM) targets were also retained at 135/85 mmHg. The recommendations emphasise the importance of achieving and maintaining a level consistently below the person's blood pressure target, whether this target be based on clinic blood pressure, HBPM or ABPM.

Based on their experience, the committee members felt that people with postural hypotension are at risk of adverse events if a sitting or lying blood pressure is used for monitoring, because this measurement would overestimate daytime blood pressure and result in overtreatment. For example, a patient with a sitting systolic blood pressure of 140 mmHg might have a much lower blood pressure when standing and be at an increased risk of falls if treated based on their sitting blood pressure. The committee decided to recommend that 3 groups who are at risk of postural hypotension (people over 80 years, with type 2 diabetes and with symptoms of postural hypotension) should have their standing blood pressure measured, and their treatment modified accordingly if they have postural hypotension. The standing blood pressure should be used for future monitoring.

How the recommendations might affect practice

The recommendations should reinforce current good practice. However, the new recommendations place more emphasis on maintaining blood pressure consistently below the blood pressure targets. As a result, this could lead to a higher use of antihypertensive drugs and an increase in consultations to maintain target blood pressure. For people with type 2 diabetes and target organ damage (not covered by other guidelines), the slightly higher target blood pressure compared to that recommended previously may reduce adverse events and may lead to fewer appointments and reduced drug use.

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Blood pressure targets for people with cardiovascular disease

Recommendation 1.4.23

Why the committee made the recommendation

The evidence did not show a robust or consistent clinical benefit from using lower blood pressure targets for people with cardiovascular disease compared with standard blood pressure targets.

The vast majority of people in the control arms of the studies achieved blood pressures well below 140/90 mmHg. In the committee's experience of practice, some people with hypertension can have their blood pressure maintained at 140/90 mmHg, rather than below this level. To address this issue, the committee amended the 2019 recommendations on blood pressure targets to emphasise the importance of reducing and maintaining blood pressure below 140/90 mmHg.

The committee made recommendations for research for:

- People aged over 80, because there was no evidence specifically for this group. The only evidence was from mixed age groups, and the committee agreed that this evidence was too limited to support a new practice recommendation.
- People with aortic aneurysm, because there was no evidence for this group.
- People who have had a stroke, because there was limited evidence that lower blood pressure targets reduced the risk of future strokes, but there was also evidence on the possible harms of lower targets. Evidence for both potential benefit and harm was too limited to inform a recommendation.

How the recommendations might affect practice

The new recommendation reflects current practice for most types of cardiovascular disease, so there should be no change in practice or increase in resource use.

The Royal College of Physicians Intercollegiate Stroke Working Party guideline recommends a lower blood pressure target for people after stroke. However, the national quality indicators used in primary care do not use a lower blood pressure target for people with cardiovascular disease (including stroke and transient ischaemic attack).

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Choosing antihypertensive drug treatment for people with cardiovascular disease

Recommendation 1.4.31

Why the committee made the recommendation

New evidence in this area was not reviewed as part of the 2022 update. Instead, the evidence from previous versions of the guideline was reassessed to look at outcomes for people with cardiovascular disease. Only evidence up to 2010 was re-analysed, because the 2019 update did not review evidence for people with cardiovascular disease.

There was no difference in clinically relevant outcomes between people with and without cardiovascular disease.

Evidence was limited for people with stroke, transient ischaemic attack, or coronary artery disease. This evidence did not cover enough treatment comparisons to allow the committee to draw any firm conclusions.

There are NICE guidelines on acute coronary syndromes and chronic heart failure, and these guidelines make recommendations on drug treatment that overlap with treatment for hypertension. To avoid confusion over the treatment pathway, the committee highlighted that these condition-specific recommendations should be applied first (for example, when prescribing an ACE inhibitor or an ARB for secondary prevention of myocardial infarction).

How the recommendations might affect practice

The recommendation reflects current practice for most types of cardiovascular disease.

The committee were aware that, after a stroke, the thiazide-like diuretic indapamide is sometimes used first, rather than a calcium channel blocker. However, it is unclear how common this is. As people with cardiovascular disease are commonly prescribed more than 1 antihypertensive drug, any impact on prescribing would be limited.

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Step 1 treatment

Recommendations 1.4.32 to 1.4.39

Why the committee made the recommendations

The committee reviewed the evidence for starting treatment for primary hypertension with a single antihypertensive medicine compared with starting with 2 antihypertensive medicines at once (dual therapy). Additionally, the committee reviewed the evidence on whether specific subgroups of people with hypertension might benefit from starting on dual therapy, for example people with type 2 diabetes, older people, or those of particular family origins.

Some limited evidence from a single study showed that initial dual therapy may reduce cardiovascular events in people with hypertension and type 2 diabetes, but the committee members were disappointed that more comprehensive data was not available. The committee discussed the benefits of optimising treatment for hypertension early and agreed that this can substantially improve quality of life. However, there was not enough evidence to determine confidently the benefits or harms of starting treatment with dual therapy. In response to the lack of available evidence, the committee developed a recommendation for research on step 1 treatment to determine if particular subgroups would benefit from starting dual therapy, to inform future guidance.

In the absence of compelling new evidence on step 1 dual therapy, the committee agreed that the previous recommendations for step 1 treatment should be retained (with minor changes for clarity), because they were based on robust clinical and cost-effectiveness evidence. One exception to this was the 2006 recommendation for considering beta-blockers in certain groups of younger people. The committee discussed this recommendation and agreed that beta-blockers are rarely used as step 1 antihypertensive treatment in current practice and there is no established relationship between beta-blocker use in primary hypertension and a reduction in cardiovascular events. For these reasons, the committee decided that the recommendation should not be retained. The committee noted that this is consistent with most international guidelines.

This guideline also updates and replaces the section on blood pressure management from NICE's guideline on type 2 diabetes in adults. That guideline recommended that adults with type 2 diabetes of any age should start on an angiotensin-converting enzyme (ACE) inhibitor as step 1 treatment (except women with a possibility of becoming pregnant and

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people of Black African or African–Caribbean family origin). The committee discussed the evidence for this and agreed that it was sufficient to support and retain this recommendation. The committee agreed it should be broadened to include the choice of an ACE inhibitor or an angiotensin II receptor blocker (ARB; also referred to as A-type drugs), because they are now cost equivalent, and the committee also agreed they are clinically equivalent.

For people of Black African or African–Caribbean family origin with type 2 diabetes, the previous recommendation was to offer step 1 dual therapy with an ACE inhibitor and either a diuretic (D-type drug) or a calcium channel blocker (CCB; C-type drug). However, these recommendations were based on monotherapy studies and when the committee looked at this evidence alongside the new dual therapy evidence review, they concluded that it was insufficient to recommend starting dual therapy in any subgroup of people with type 2 diabetes. The committee noted that people with type 2 diabetes who are older or are of Black African or African–Caribbean family origin may not achieve their target blood pressure on ACE inhibitor or ARB monotherapy and may need to start step 2 drug therapy in the short term.

How the recommendations might affect practice

Overall, the recommendations for step 1 treatment reflect current practice for people who do not have type 2 diabetes. For people of Black African or African–Caribbean family origin who have type 2 diabetes, the recommendation to start antihypertensive monotherapy rather than dual therapy may result in an extra clinical appointment if the dose needs to be adjusted. However, it may also reduce potential harms from initial overtreatment of blood pressure.

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Step 2 and 3 treatment

Recommendations 1.4.40 to 1.4.45

Why the committee made the recommendations

No evidence for step 2 or step 3 treatment was identified that was relevant to determining the best sequence for step 2 and step 3 antihypertensive treatment. Some of the studies

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available on drug treatments for hypertension were not included in this review because they were designed to inform step 1 treatment. Others did not reflect UK clinical practice. For details of these studies see evidence review F: step 2 and step 3 treatment.

Based on evidence from the previous version of the guideline and their clinical expertise, the committee members agreed to retain the same choice of drugs from the 2011 guideline, which reflect current best practice. The committee agreed that, in the absence of evidence of which treatment(s) are most effective for step 2 or step 3, the recommendation should be to offer any of these treatments based on an individualised approach informed by risks and benefits of each treatment and the person with hypertension's preference.

The committee noted that the changes to the step 1 recommendations for some people with type 2 diabetes do not necessitate a change in the step 2 recommendations since the same options for combination treatment at step 2 are available.

The committee agreed that the choice of drug should be discussed and agreed with the person, based on the person's step 1 treatment, the risks and benefits of each treatment option, and taking into account the person's preferences and other clinical factors. The updated recommendations reflect this, giving the choice of possible treatment options. A NICE patient decision aid on treatment choices for high blood pressure has been developed to support healthcare professionals and people with hypertension to discuss their treatment options and make informed decisions.

How the recommendations might affect practice

The recommendations are unlikely to alter current practice. The options for drug treatment remain the same and most step 2 or 3 treatment decisions are already based on an individualised approach.

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Step 4 treatment

Recommendations 1.4.46 to 1.4.52

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Why the committee made the recommendations

No evidence on step 4 treatment was identified that could be used to formulate new recommendations. However, the committee reviewed the 2011 recommendations and agreed that they should be retained and updated to reflect current best practice.

The committee discussed the importance of confirming resistant hypertension before starting step 4 treatment. Based on their clinical experience and knowledge of best current practice, the committee members agreed that a recommendation to highlight this would help prevent overtreatment and ensure that people receive the right care.

Despite the lack of evidence formally reviewed, the committee discussed the recommendation based on their clinical experience, taking the 2011 recommendations into account. The committee agreed that although the evidence for spironolactone did not meet the criteria for inclusion in the updated review for the guideline because the key study had a very short follow up and did not report any of the cardiovascular outcomes specified in this review protocol, the use of an aldosterone antagonist is now common clinical practice. Therefore, there was no reason to suggest that this recommendation should be changed.

In the 2011 guideline, high-dose thiazide diuretics were recommended as a potential step 4 treatment in people with high blood potassium levels. The committee felt that there was a lack of evidence for this approach and noted that the studies did not show an improvement in cardiovascular outcomes at higher doses, albeit in people without resistant hypertension. The committee agreed that the recommendation for considering alpha- or beta-blockers should be retained based on significant clinical experience of their safe and effective use and because adding a further drug is likely to have a greater effect on blood pressure than increasing the thiazide diuretic dose.

How the recommendations might affect practice

The recommendations represent current good practice and so should not change practice. High-dose thiazide diuretics are not commonly used as step 4 therapy and so removing this should not change practice.

There might be a small reduction in step 4 treatment with more thorough checks to confirm resistant hypertension. However, this may also result in an increase in blood pressure measurements to appropriately confirm resistant hypertension where this is not

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already being done.

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Identifying who to refer for same-day specialist review

Recommendations 1.5.1 to 1.5.3

Why the committee made the recommendations

There was no evidence identified to inform recommendations on this topic. The committee reviewed the 2011 recommendations and agreed that they should be updated by consensus based on their clinical expertise. In particular they agreed it would be helpful to clarify which features warranted same-day referral, which would need further investigation and when repeat blood pressure measurement should be taken.

The committee noted that it can be difficult to differentiate between accelerated hypertension and severe hypertension. They discussed the advantages and disadvantages of broader criteria for same-day referral, which would increase referrals to hospital but reduce the risk of missing people who need urgent treatment. The committee decided it would be beneficial to add some emergency symptoms to the existing recommendation, which will help healthcare professionals to decide when to refer.

Based on their experience, the committee members agreed that some people with severe hypertension could be receiving unnecessary treatment because the 2011 guideline recommended treatment based on severe hypertension alone. The committee agreed that this could be prevented if investigations for target organ damage were carried out quickly before offering treatment in people with severely raised blood pressure and no other symptoms of concern. The committee also agreed that checking blood pressure again within 7 days in people with no target organ damage would ensure that people with severe hypertension are followed up and offered suitable treatment.

The committee agreed that further research is needed in this area, particularly for people with extreme hypertension (220/120 mmHg or higher) or emergency symptoms. The committee members developed a recommendation for research on same-day hospital specialist assessment to help inform future recommendations.

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How the recommendations might affect practice

The emergency symptoms listed in the recommendation may lead to more referrals to hospital. However, people with emergency symptoms will benefit from urgent treatment because accelerated hypertension can be fatal if untreated.

There may be some additional resource use from doing target organ damage tests more quickly and re-measuring blood pressure within 7 days. However, the number of people started on treatment immediately may be reduced because of undertaking investigations first.

The population with severe hypertension is very small, and the proportion with severe hypertension and additional symptoms that suggest accelerated hypertension is even smaller; therefore, resource impact is unlikely to be substantial.

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Context

High blood pressure (hypertension) is one of the most important, treatable causes of premature morbidity and mortality in the world. It is a major risk factor for stroke, myocardial infarction, heart failure, chronic kidney disease, cognitive decline and premature death. In 2015, it was reported that high blood pressure affected more than 1 in 4 adults in England (31% of men; 26% of women) – around 13.5 million people – and contributed to 75,000 deaths. The clinical management of hypertension accounts for 12% of visits to primary care and up to £2.1 billion of healthcare expenditure. Managing the cardiovascular events caused by hypertension also consumes considerable resources.

The guideline covers adults (over 18 years) with suspected or diagnosed hypertension, including those with type 2 diabetes.

2019 update

Between 2010 and 2020, progress has been made to improve the diagnosis and management of hypertension: the population average blood pressure in England has fallen by about 3 mmHg systolic and the proportion of adults with untreated high blood pressure has decreased. However, the Public Health England Blood Pressure Action Plan called for further action to reduce the population average blood pressure by 5 mmHg through improved prevention, detection and management (Public Health England's Tackling high blood pressure: from evidence into action, 2015 and Tackling high blood pressure: an update, 2018).

Since the publication of the 2011 NICE guideline on hypertension, new studies have been published in key areas of management; in particular, the optimal method and threshold for diagnosis of hypertension, managing blood pressure in lower risk populations and reducing blood pressure to lower targets in people with hypertension (including those with type 2 diabetes). The updated guideline makes new recommendations in these areas, based on the evidence, that aim to improve care and reduce variation in current practice.

Treating resistant hypertension (when more than 3 drugs are needed to treat hypertension) remains challenging. New data was also reviewed in this area and the recommendations updated.

There is uncertainty in current practice about which people with symptomatic very high

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blood pressure (accelerated hypertension) to refer for immediate assessment. The available evidence was reviewed and new recommendations made to provide guidance for primary care on when to refer.

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Finding more information and committee details

To find NICE guidance on related topics, including guidance in development, see the NICE topic page on hypertension.

For full details of the evidence and the guideline committee's discussions, see the evidence reviews. You can also find information about how the guideline was developed, including details of the committee.

NICE has produced tools and resources to help you put this guideline into practice. For general help and advice on putting our guidelines into practice, see resources to help you put NICE guidance into practice.

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Update information

November 2023: We updated recommendations 1.1.5, 1.1.6 and 1.4.16 and made 2 new recommendations (1.1.7 and 1.1.8) on how to measure and manage postural hypotension (see the February 2023 surveillance report). We also added 2 tables to the section on monitoring treatment and blood pressure targets to summarise blood pressure targets in this guideline and NICE's guidelines on type 1 diabetes and chronic kidney disease (see the November 2023 surveillance report).

March 2022: We have reviewed the evidence on blood pressure targets for people with cardiovascular disease, and made a new recommendation. This is marked **[2022]**.

We have also reassessed the evidence on antihypertensive drug treatment, and made a new recommendation for people with cardiovascular disease. This is marked **[2022]**.

For recommendations ending **[2019, amended 2022]**, we have not reviewed the evidence for people without cardiovascular disease. We have made minor changes to the wording of the recommendations without changing the intent. For an explanation of these changes, see the rationale and impact section on blood pressure targets for people with cardiovascular disease.

August 2019: We have reviewed the evidence and made new recommendations on diagnosis, monitoring and drug treatment for hypertension, and identifying who to refer for same-day specialist review. These recommendations are marked **[2019]**.

We have also made some changes without an evidence review:

- the information on cuff size for measuring blood pressure was moved to avoid repetition
- plasma glucose testing was replaced with glycated haemoglobin (HbA1C) to reflect current practice
- a note was added because of concerns about the risks of salt substitutes in some groups
- the information on when to refer to the hypertension in pregnancy guideline was made clearer.

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These recommendations are marked **[2004, amended 2019]** or **[2011, amended 2019]**.

Recommendations marked **[2004]**, **[2006]**, **[2008]**, **[2009]** and **[2011]** last had an evidence review in that year. In some cases minor changes have been made to the wording to bring the language and style up to date, without changing the meaning.

Recommendations 1.2.11 and 1.4.24 (marked **[2009]**) were originally published in section 1.4 of NICE's guideline on type 2 diabetes in adults, which was updated by this guideline.

Minor changes since publication

June 2024: We corrected recommendation 1.4.26 to read 'antihypertensive' instead of 'hypertensive'.

October 2023: We corrected a link to an evidence review.

July 2022: In recommendation 1.5.1 we clarified the options for people with a blood pressure of 180/120 mmHg or more and no target organ damage.

November 2021: We added a link to the blood pressure@home scheme in recommendation 1.4.17.

December 2019: Recommendation 1.4.13 was amended to clarify that it applies to adults over 80 with stage 1 hypertension. We also made changes to introductory text to clarify that recommendations apply to all adults, including those with type 2 diabetes, unless links to other NICE guidelines indicate that treatment differs.

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