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Hypertension

**Management of hypertension in adults
in primary care**

**This is a partial update of NICE clinical
guideline 18**

NICE clinical guideline 34

Developed by the Newcastle Guideline Development and Research Unit; the section on prescribing drugs has been updated by the British Hypertension Society and the National Collaborating Centre for Chronic Conditions

NICE clinical guideline 34
Hypertension: management of hypertension in adults in primary care
(partial update of NICE clinical guideline 18)

Ordering information

You can download the following documents from www.nice.org.uk/CG034

- The NICE guideline (this document) – all the recommendations.
- A quick reference guide, which has been distributed to healthcare professionals working in the NHS in England.
- ‘Understanding NICE guidance’ – information for patients and carers.
- The full guideline – all the recommendations, details of how they were developed, and summaries of the evidence on which they were based.

For printed copies of the quick reference guide or information for the public, phone the NHS Response Line on 0870 1555 455 and quote:

- N1050 (quick reference guide)
- N1051 (‘Understanding NICE guidance’).

This guidance is written in the following context:

This guidance represents the view of the Institute, 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. The guidance does not, however, 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.

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This is a partial update of NICE clinical guideline 18 (published August 2004).

The update has been developed by the National Collaborating Centre for Chronic Conditions and the British Hypertension Society (www.bhsoc.org).

The original guideline was developed by the Newcastle Guideline Development and Research Unit. In this update, only the recommendations on prescribing drugs for hypertension (section 1.4) have been changed; no other recommendations are affected. The original NICE guideline and supporting documents are available from www.nice.org.uk/CG018

Introduction

This NICE guideline provides recommendations for the primary care management of raised blood pressure (BP).

Hypertension is a major but modifiable contributory factor in cardiovascular diseases (CVD) such as stroke and coronary heart disease (CHD). The objective of this guideline is to decrease cardiovascular morbidity and mortality resulting from these diseases. It is important to assess risk in people before CVD develops and monitoring for persistently raised BP is one aspect of CV risk assessment.

This guideline makes recommendations on primary care management of hypertension. It includes recommendations on approaches to identifying patients with persistently raised BP, and managing hypertension (including lifestyle advice and use of BP-lowering drugs).

This guideline does not address screening for hypertension, management of hypertension in pregnancy or the specialist management of secondary hypertension (where renal or pulmonary disease, endocrine complications or other disease underlie raised blood pressure). Patients with existing coronary heart disease or diabetes should be managed in line with current national guidance for these conditions.

Why a NICE guideline on hypertension?

This NICE guideline on the management of hypertension is based on the best available evidence. A multidisciplinary Guideline Development Group carefully considered evidence of both the clinical effectiveness and cost effectiveness of treatment and care in developing these recommendations. The draft guideline was then modified in the light of two rounds of extensive consultation with the relevant stakeholder groups, including NHS organisations, healthcare professionals, patient/carer groups and manufacturers.

Patient-centred care

This guideline offers best practice advice on the care of adults with hypertension.

Treatment and care should take into account patients' individual needs and preferences. People with hypertension should have the opportunity to make informed decisions about their care and treatment. Where patients do not have the capacity to make decisions, healthcare professionals should follow the Department of Health guidelines – 'Reference guide to consent for examination or treatment' (2001) (available from www.dh.gov.uk).

Good communication between healthcare professionals and patients is essential. It should be supported by the provision of evidence-based information offered in a form that is tailored to the needs of the individual patient. The treatment, care and information provided should be culturally appropriate and in a form that is accessible to people who have additional needs, such as people with physical, cognitive or sensory disabilities, and people who do not speak or read English.

Unless specifically excluded by the patient, carers and relatives should have the opportunity to be involved in decisions about the patient's care and treatment.

Carers and relatives should also be provided with the information and support they need.

Key priorities for implementation

The following recommendations have been identified as priorities for implementation.

Measuring blood pressure

- To identify hypertension (persistent raised blood pressure above 140/90 mmHg), ask the patient to return for at least two subsequent clinics where blood pressure is assessed from two readings under the best conditions available.
- Routine use of automated ambulatory blood pressure monitoring or home monitoring devices in primary care is not currently recommended because their value has not been adequately established; appropriate use in primary care remains an issue for further research.

Lifestyle interventions

- Lifestyle advice should be offered initially and then periodically to patients undergoing assessment or treatment for hypertension.

Cardiovascular risk

- If raised blood pressure persists and the patient does not have established cardiovascular disease, discuss with them the need to formally assess their cardiovascular risk. Tests may help identify diabetes, evidence of hypertensive damage to the heart and kidneys, and secondary causes of hypertension such as kidney disease.
- Consider the need for specialist investigation of patients with signs and symptoms suggesting a secondary cause of hypertension. Accelerated (malignant) hypertension and suspected pheochromocytoma require immediate referral.

Pharmacological interventions

- Drug therapy reduces the risk of cardiovascular disease and death.
Offer drug therapy to:
 - patients with persistent high blood pressure of 160/100 mmHg or more
 - patients at raised cardiovascular risk (10-year risk of CVD of 20% or more, or existing CVD or target organ damage) with persistent blood pressure of more than 140/90 mmHg.
- In hypertensive patients aged 55 or older or black patients of any age, the first choice for initial therapy should be either a calcium-channel blocker or a thiazide-type diuretic. For this recommendation, black patients are considered to be those of African or Caribbean descent, not mixed-race, Asian or Chinese.
- In hypertensive patients younger than 55, the first choice for initial therapy should be an angiotensin-converting enzyme (ACE) inhibitor (or an angiotensin-II receptor antagonist if an ACE inhibitor is not tolerated).

Continuing treatment

- Provide an annual review of care to monitor blood pressure, provide patients with support and discuss their lifestyle, symptoms and medication.
- Patients may become motivated to make lifestyle changes and want to stop using antihypertensive drugs. If at low cardiovascular risk and with well controlled blood pressure, these patients should be offered a trial reduction or withdrawal of therapy with appropriate lifestyle guidance and ongoing review.

The following guidance is evidence based. The evidence supporting each recommendation is provided in the full guideline (see Section 5). Recommendations are classified according to the type of evidence they are based on (see appendix A).

1 Guidance

1.1 Measuring blood pressure

- 1.1.1 Healthcare professionals taking blood pressure measurements need adequate initial training and periodic review of their performance. **D**
- 1.1.2 Healthcare providers must ensure that devices for measuring blood pressure are properly validated, maintained and regularly recalibrated according to manufacturers' instructions. **D**
- 1.1.3 Where possible, standardise the environment when measuring blood pressure: provide a relaxed, temperate setting, with the patient quiet and seated and with their arm outstretched and supported*. **D**

** The principles of good technique for measuring blood pressure are presented in box 1.*

- 1.1.4 If the first measurement exceeds 140/90 mmHg*, if practical, take a second confirmatory reading at the end of the consultation. **D**

** Blood pressure is recorded as systolic/diastolic blood pressure measured in millimetres of mercury (mmHg). Raised blood pressure is noted when either systolic pressure exceeds 140 mmHg or diastolic blood pressure exceeds 90 mmHg.*

- 1.1.5 Measure blood pressure on both of the patient's arms with the higher value identifying the reference arm for future measurement. **D**
- 1.1.6 In patients with symptoms of postural hypotension (falls or postural dizziness) measure blood pressure while patient is standing. In patients with symptoms or documented postural hypotension (fall in systolic BP when standing of 20 mmHg or more) consider referral to a specialist. **D**

- 1.1.7 Refer immediately patients with accelerated (malignant) hypertension (BP more than 180/110 mmHg with signs of papilloedema and/or retinal haemorrhage) or suspected pheochromocytoma (possible signs include labile or postural hypotension, headache, palpitations, pallor and diaphoresis). **D**
- 1.1.8 To identify hypertension (persistent raised blood pressure, above 140/90 mmHg), ask the patient to return for at least two subsequent clinics where blood pressure is assessed from two readings under the best conditions available. **D**
- 1.1.9 Measurements should normally be made at monthly intervals. However, patients with more severe hypertension should be re-evaluated more urgently. **D**
- 1.1.10 Routine use of automated ambulatory blood pressure monitoring or home monitoring devices in primary care is not currently recommended because their value has not been adequately established; appropriate use in primary care remains an issue for further research. **C**
- *Readings from clinic and ambulatory blood pressure devices, when used side-by-side, may differ from one another and from true arterial pressure because they use different methods and assumptions.*
 - *Average ambulatory readings from a series of patients, taken over 24 hours, are commonly lower than clinic readings by between 10/5 and 20/10 mmHg. However, an individual patient may have ambulatory readings higher or lower than clinic readings. Studies comparing clinic and ambulatory measurement vary in their design, setting, conduct of measurement and analysis: estimated differences between ambulatory and clinic values vary with these factors.*
 - *Clinic and ambulatory readings may also differ because of a 'white coat' effect – that is, a response to the setting or clinician.*
 - *Epidemiological studies are inconsistent in demonstrating the additional prognostic value of ambulatory blood pressure monitoring to predict cardiovascular disease in unselected patients.*

1.1.11 Consider the need for specialist investigation of patients with unusual signs and symptoms, or of those whose management depends critically on the accurate estimation of their blood pressure. **D**

BOX 1 Estimation of blood pressure by auscultation

- Standardise the environment as much as possible:
 - relaxed temperate setting, with the patient seated
 - arm out-stretched, in line with mid-sternum, and supported.
- Correctly wrap a cuff containing an appropriately sized bladder around the upper arm and connect to a manometer. Cuffs should be marked to indicate the range of permissible arm circumferences; these marks should be easily seen when the cuff is being applied to an arm.
- Palpate the brachial pulse in the antecubital fossa of that arm.
- Rapidly inflate the cuff to 20 mmHg above the point where the brachial pulse disappears.
- Deflate the cuff and note the pressure at which the pulse re-appears: the approximate systolic pressure.
- Re-inflate the cuff to 20 mmHg above the point at which the brachial pulse disappears.
- Using one hand, place the stethoscope over the brachial artery ensuring complete skin contact with no clothing in between.
- Slowly deflate the cuff at 2–3 mmHg per second listening for Korotkoff sounds.
 - Phase I: The first appearance of faint repetitive clear tapping sounds gradually increasing in intensity and lasting for at least two consecutive beats: note the systolic pressure.
 - Phase II: A brief period may follow when the sounds soften or 'swish'.
 - Auscultatory gap: In some patients, the sounds may disappear altogether.
 - Phase III: The return of sharper sounds becoming crisper for a short time.
 - Phase IV: The distinct, abrupt muffling of sounds, becoming soft and blowing in quality.
 - Phase V: The point at which all sounds disappear completely: note the diastolic pressure.
- When the sounds have disappeared, quickly deflate the cuff completely if repeating the measurement.
- When possible, take readings at the beginning and end of consultations.

1.2 Lifestyle interventions

1.2.1 Ascertain patients' 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. **B**

- *Education about lifestyle on its own is unlikely to be effective.*
- *Healthy, low-calorie diets had a modest effect on blood pressure in overweight individuals with raised blood pressure, reducing systolic and diastolic blood pressure on average by about 5–6 mmHg in trials. However, there is variation in the reduction in blood pressure achieved in trials and it is unclear why. About 40% of patients were estimated to achieve a reduction in systolic blood pressure of 10 mmHg systolic or more in the short term, up to 1 year.*
- *Taking aerobic exercise (brisk walking, jogging or cycling) for 30–60 minutes, three to five times each week, had a small effect on blood pressure, reducing systolic and diastolic blood pressure on average by about 2–3 mmHg in trials. However, there is variation in the reduction in blood pressure achieved in trials and it is unclear why. About 30% of patients were estimated to achieve a reduction in systolic blood pressure of 10 mmHg or more in the short term, up to 1 year.*
- *Interventions actively combining exercise and diet were shown to reduce both systolic and diastolic blood pressure by about 4–5 mmHg in trials. About one-quarter of patients receiving multiple lifestyle interventions were estimated to achieve a reduction in systolic blood pressure of 10 mmHg systolic or more in the short term, up to 1 year.*
- *A healthier lifestyle, by lowering blood pressure and cardiovascular risk, may reduce, delay or remove the need for long-term drug therapy in some patients.*

1.2.2 Relaxation therapies* can reduce blood pressure and individual patients may wish to pursue these as part of their treatment. However, routine provision by primary care teams is not currently recommended. **B**

* *Examples include: stress management, meditation, cognitive therapies, muscle relaxation and biofeedback.*

- Overall, structured interventions to reduce stress and promote relaxation had a modest effect on blood pressure, reducing systolic and diastolic blood pressure on average by about 3–4 mmHg in trials. There is variation in the reduction in blood pressure achieved in trials and it is unclear why. About one-third of patients receiving relaxation therapies were estimated to achieve a reduction in systolic blood pressure of 10 mmHg systolic or more in the short term, up to 1 year.
- The current cost and feasibility of providing these interventions in primary care has not been assessed and they are unlikely to be routinely provided.

1.2.3 Ascertain patients' alcohol consumption and encourage a reduced intake if patients drink excessively, because this can reduce blood pressure and has broader health benefits. **B**

- Excessive alcohol consumption (men: more than 21 units/week; women: more than 14 units/week) is associated with raised blood pressure and poorer cardiovascular and hepatic health.
- Structured interventions to reduce alcohol consumption, or substitute low alcohol alternatives, had a modest effect on blood pressure, reducing systolic and diastolic blood pressure on average by about 3–4 mmHg in trials. Thirty percent of patients were estimated to achieve a reduction in systolic blood pressure of 10 mmHg systolic or more in the short term, up to 1 year.
- Brief interventions by clinicians of 10–15 minutes, assessing intake and providing information and advice as appropriate, have been reported to reduce alcohol consumption by one-quarter in excessive drinkers with or without raised blood pressure, and to be as effective as more specialist interventions.
- Brief interventions have been estimated to cost between £40 and £60 per patient receiving intervention. The structured interventions used in trials of patients with hypertension have not been costed.

1.2.4 Discourage excessive consumption of coffee and other caffeine-rich products. **C**

- Excessive consumption of coffee (five or more cups per day) is associated with a small increase in blood pressure (2/1 mmHg) in participants with or without raised blood pressure in studies of several months duration.

1.2.5 Encourage patients to keep their dietary sodium intake low, either by reducing or substituting sodium salt, as this can reduce blood pressure. **B**

- *Advice to reduce dietary salt intake to less than 6.0 g/day (equivalent to 2.4 g/day dietary sodium) was shown to achieve a modest reduction in systolic and diastolic blood pressure of 2–3 mmHg in patients with hypertension, at up to 1 year in trials. About one-quarter of patients were estimated to achieve a reduction in systolic blood pressure of 10 mmHg systolic or more in the short term, up to 1 year.*
- *Long-term evidence over 2–3 years from studies of normotensive patients shows that reductions in blood pressure tend to diminish over time.*
- *One trial suggests that reduced sodium salt, when used as a replacement in both cooking and seasoning, is as effective in reducing blood pressure as restricting the use of table salt.*

1.2.6 Do not offer calcium, magnesium or potassium supplements as a method for reducing blood pressure. **B**

- *The best current evidence does not show that calcium, magnesium or potassium supplements produce sustained reductions in blood pressure.*
- *The best current evidence does not show that combinations of potassium, magnesium and calcium supplements reduce blood pressure.*

1.2.7 Offer advice and help to smokers to stop smoking. **A**

- *There is no strong direct link between smoking and blood pressure. However, there is overwhelming evidence of the relationship between smoking and cardiovascular and pulmonary diseases, and evidence that smoking cessation strategies are cost effective.*
- *See: Guidance on the use of nicotine replacement therapy (NRT) and bupropion for smoking cessation, NICE technology appraisal no. 39, March 2002.
www.nice.org.uk/TA039*

1.2.8 A common aspect of studies for motivating lifestyle change is the use of group working. Inform patients about local initiatives by, for

example, healthcare teams or patient organisations that provide support and promote healthy lifestyle change. **D**

1.3 Estimating cardiovascular risk

- 1.3.1 If raised blood pressure persists and the patient does not have established cardiovascular disease, discuss with them the need to formally assess their cardiovascular risk. Tests may help identify diabetes, evidence of hypertensive damage to the heart and kidneys, and secondary causes of hypertension such as kidney disease. **D**
- 1.3.2 Test for the presence of protein in the patient's urine. Take a blood sample to assess plasma glucose, electrolytes, creatinine, serum total cholesterol and HDL cholesterol. Arrange for a 12-lead electrocardiograph to be performed. **D**
- 1.3.3 Consider the need for specialist investigation of patients with signs and symptoms suggesting a secondary cause of hypertension. Accelerated (malignant) hypertension and suspected pheochromocytoma require immediate referral. **D**
- *An identifiable cause of hypertension is more likely when hypertension occurs in younger patients (less than 30 years of age), worsens suddenly, presents as accelerated (malignant) hypertension (BP more than 180/110 mmHg with signs of papilloedema and/or retinal haemorrhage) or responds poorly to treatment.*
 - *An elevated creatinine level may indicate renal disease. Labile or postural hypotension, headache, palpitations, pallor and diaphoresis are potential signs of pheochromocytoma. Hypokalaemia, abdominal or flank bruits, or a significant rise in serum creatinine when starting an ACE-inhibitor may indicate renovascular hypertension. Isolated hypokalaemia may be due to hyperaldosteronism. Potential signs of Cushing syndrome include osteoporosis, truncal obesity, moon face, purple striae, muscle weakness, easy bruising, hirsutism, hyperglycaemia, hypokalaemia and hyperlipidaemia.*
- 1.3.4 Use the cardiovascular risk assessment to discuss prognosis and healthcare options with patients, both for raised blood pressure and other modifiable risk factors. **D**

- *Risk models provide a useful prognostic tool for clinicians and patients in primary care. They reinforce the need to offer treatment to patients based on their profile of cardiovascular risk rather than focusing on blood pressure in isolation.*
- *Most risk models derive from the Framingham Heart Study: a cohort of over 5000 men and women aged 30–62 years from Framingham, Massachusetts followed up from 1971 to assess the determinants of cardiovascular disease.*
- *Limitations of commonly used risk models include poor validation in UK ethnic minorities and younger populations.*
- *Framingham risk calculator computer programmes currently provide the best assessment of risk of coronary heart disease and stroke over 10 years. The latest version developed by the Joint British Societies* gives the risk of a cardiovascular event over 10 years (a combined score including the risk of coronary heart disease and stroke).*
- *Risk charts may be relatively imprecise, placing patients in bands of risks, although the visual presentation may be helpful to some patients. Evidence suggests the Joint British Societies chart adheres most closely to Framingham risk calculators.*
- *When only the CHD risk score is known, CVD risk score can be approximated by multiplying by 4/3. When CHD and stroke risk are reported, the CVD risk can be approximated by adding these two scores together.*

** Joint British Societies Cardiovascular Risk Charts are available from the British National Formulary.*

1.4 Pharmacological interventions

For this updated guideline issued by NICE and the British Hypertension Society (www.bhsoc.org), new studies published since July 2004 were appraised and the data considered together with those from the earlier studies, using meta-analysis where appropriate. The Guideline Development Group (GDG) considered this evidence in the context of other available evidence. Adverse events data and issues of patient concordance were particularly noted, and the GDG also had access to a detailed health economic analysis comparing the cost-effectiveness of the main drug classes. Consideration was also given to the pathogenesis of hypertension and the

mechanism of action of the different classes of drugs used to lower blood pressure, taking age and ethnicity into account. Finally, where the evidence did not prove definitive, the GDG took into account existing guidelines and constructed recommendations most compatible with current good practice.

In formulating its recommendations, the GDG has assumed a 'drug class effect' unless there was clear evidence to the contrary. However, clinical-outcome trials involving thiazide-type diuretics have used a variety of different drugs at different doses. Moreover, the GDG felt that the benefits from ACE inhibitors and angiotensin-II receptor antagonists were closely correlated and that they should be treated as equal in terms of efficacy (although, because of cost differences, ACE inhibitors should be initiated first).

One class of drugs that caused particular debate was the beta-blockers. In head-to-head trials, beta-blockers were usually less effective than a comparator drug at reducing major cardiovascular events, in particular stroke. Atenolol was the beta-blocker used in most of these studies and, in the absence of substantial data on other agents, it is unclear whether this conclusion applies to all beta-blockers.

The evidence showed calcium-channel blockers or thiazide-type diuretics to be the drugs most likely to confer benefit as first-line treatment for most patients. The health economic model slightly favoured calcium-channel blockers, with thiazide-type diuretics as the next most cost-effective option. On balance, the GDG decided that calcium-channel blockers and thiazide-type diuretics should be offered as equal alternatives for clinicians and patients to consider as initial treatment. Consideration should be given to the patient's risk of adverse effects and preferences.

This conclusion is less certain for younger patients (defined pragmatically as those younger than 55, who were often not included in the clinical trials reviewed). In the absence of clinical outcomes data in younger patients, the GDG considered that for pragmatic reasons it was essential to make a recommendation, and considered blood pressure lowering as the most suitable surrogate for clinical outcomes. What data there are suggest that

initial therapy with a beta-blocker or an ACE inhibitor may provide superior initial blood pressure lowering compared with a calcium-channel blocker or a thiazide-type diuretic. The studies suggesting beta-blockers are generally an inferior choice have already been covered. Consequently, for patients younger than 55, an ACE inhibitor (or an angiotensin-II receptor antagonist if an ACE-inhibitor is not tolerated) is a better choice as initial therapy.

Many patients will require more than one drug to achieve adequate blood pressure control. An algorithm is provided on page 45. Pathophysiological reasoning suggests that adding an ACE inhibitor to a calcium-channel blocker or a diuretic (or vice versa in the younger group – that is, adding either a calcium-channel blocker or a diuretic to an ACE inhibitor) are logical combinations. In addition, these combinations have been commonly used at step 2 in clinical trials. Beyond this point there is even less evidence to guide practice, but the GDG concluded that the most straightforward choice is to recommend combining the three drug classes that have been used at steps 1 and 2 in treatment – that is, offering a three-drug combination of an ACE inhibitor (or angiotensin-II receptor antagonist) plus a calcium-channel blocker plus a thiazide-type diuretic.

The GDG was also concerned by the higher risk of patients developing diabetes, particularly when treated with the combination of a beta-blocker and a thiazide-type diuretic. Omitting beta-blockers from the routine treatment algorithm was therefore justified. Nevertheless, the GDG noted that there are certain compelling indications for beta-blockers and these have been specified.

Recommendations beyond a three-drug combination are based on consensus rather than hard evidence, but it was felt that practitioners would appreciate some guidance. The GDG also felt that if three drugs in combination were failing to provide adequate blood pressure control, a practitioner might consider seeking expert advice.

The recommendations below should be read in conjunction with the algorithms on pages 44 and 45.

- 1.4.1 Drug therapy reduces the risk of cardiovascular disease and death. Offer drug therapy to: **A**
- patients with persistent high blood pressure of 160/100 mmHg or more
 - patients at raised cardiovascular risk (10-year risk of CVD of 20% or more, or existing cardiovascular disease or target organ damage) with persistent blood pressure of more than 140/90 mmHg.
 - *In placebo-controlled trials, blood pressure management beginning with a low-dose thiazide-type diuretic or beta-blocker has been shown to reduce mortality, myocardial infarction and stroke (relative risk reductions of 8%, 15% and 25%, respectively).*
- 1.4.2 Provide appropriate guidance and materials about the benefits of drugs and the unwanted side effects sometimes experienced in order to help patients make informed choices. **D**
- 1.4.3 Offer drug therapy, adding different drugs if necessary, to achieve a target of 140/90 mmHg, or until further treatment is inappropriate or declined. Titrate drug doses as described in the 'British national formulary' noting any cautions and contraindications. **A**
- *In trials aiming to reduce blood pressure to below 140/90 mmHg using stepped medication regimens, between one-half and three-quarters of patients achieved target blood pressure.*
 - *In these trials about one-half of patients needed treatment with more than one drug.*
- 1.4.4 **New** In hypertensive patients aged 55 or older or black patients of any age, the first choice for initial therapy should either be a calcium-channel blocker or a thiazide-type diuretic. For this recommendation, black patients are considered to be those of African or Caribbean descent, not mixed-race, Asian or Chinese. **A***
- 1.4.5 **New** In hypertensive patients younger than 55, the first choice for initial therapy should be an angiotensin-converting enzyme (ACE)

inhibitor (or an angiotensin-II receptor antagonist if an ACE inhibitor is not tolerated). **C***

- 1.4.6 **New** If initial therapy was with a calcium-channel blocker or a thiazide-type diuretic and a second drug is required, add an ACE inhibitor (or an angiotensin-II receptor antagonist if an ACE inhibitor is not tolerated). If therapy was initiated with an ACE inhibitor (or angiotensin-II receptor antagonist), add a calcium-channel blocker or a thiazide-type diuretic. **B***
- 1.4.7 **New** If treatment with three drugs is required, the combination of ACE inhibitor (or angiotensin-II receptor antagonist), calcium-channel blocker and thiazide-type diuretic should be used. **B***
- 1.4.8 **New** If blood pressure remains uncontrolled on adequate doses of three drugs, consider adding a fourth and/or seeking expert advice. **C***
- 1.4.9 **New** If a fourth drug is required, one of the following should be considered: **C***
- a higher dose of a thiazide-type diuretic or the addition of another diuretic (careful monitoring is recommended) or
 - beta-blockers or
 - selective alpha-blockers.
- 1.4.10 **New** If blood pressure remains uncontrolled on adequate doses of four drugs, and expert advice has not yet been obtained, this should now be sought. **C***
- 1.4.11 **New** Beta-blockers are not a preferred initial therapy for hypertension. However, beta-blockers may be considered in younger people, particularly: **B***
- those with an intolerance or contraindication to ACE inhibitors and angiotensin-II receptor antagonists or
 - women of child-bearing potential or
 - people with evidence of increased sympathetic drive.

In these circumstances, if therapy is initiated with a beta-blocker and a second drug is required, add a calcium-channel blocker rather than a thiazide-type diuretic to reduce the patient's risk of developing diabetes. **C***

1.4.12 **New** In patients whose blood pressure is not controlled (that is, above 140/90 mmHg) despite a treatment regimen that includes a beta-blocker, treatment should be revised according to the treatment algorithm on page 45 (see also 1.4.14). **C***

1.4.13 **New** In patients whose blood pressure is well controlled (that is, 140/90 mmHg or below) with a regimen that includes a beta-blocker, long-term management should be considered as part of their routine review. In these patients there is no absolute need to replace the beta-blocker with an alternative agent. **C***

1.4.14 **New** When a beta-blocker is withdrawn, the dose should be stepped down gradually. Beta-blockers should not be withdrawn in patients who have compelling indications for beta-blockade, for example those who have symptomatic angina or who have had a myocardial infarction. **C***

1.4.15 Offer patients with isolated systolic hypertension (systolic BP 160 mmHg or more) the same treatment as patients with both raised systolic and diastolic blood pressure. **A**

- *Patients with isolated systolic hypertension received similar benefits from treatment to other patients with raised blood pressure.*

1.4.16 Offer patients over 80 years of age the same treatment as other patients over 55, taking account of any comorbidity and their existing burden of drug use. **A**

- *Patients over 80 years of age are poorly represented in clinical trials and the effectiveness of treatment in this group is less certain. However, it is reasonable to assume that older patients will receive worthwhile benefits from drug treatment, particularly in terms of reduced risk of stroke.*

1.4.17 Where possible, recommend treatment with drugs taken only once a day. **A**

- *A meta-analysis found that patients adhered to once-daily blood pressure lowering regimens better than to regimens requiring two or more doses a day (91% versus 83%). Similarly, once-daily regimens were better adhered to than twice-daily regimens (93% versus 87%).*

1.4.18 Prescribe non-proprietary drugs where these are appropriate and minimise cost. **D**

- *Drug treatment beginning with either a non-proprietary thiazide-type diuretic or beta-blocker minimises cost.*
- *From a model of lifetime costs and effects, based on the findings of trials, treatment using stepped care including thiazide-type diuretics, beta-blockers, ACE-inhibitors/angiotensin receptor blockers and calcium-channel blockers is estimated to be cost effective.*

1.5 Continuing treatment

1.5.1 The aim of medication is to reduce blood pressure to 140/90 mmHg or below. However, patients not achieving this target, or for whom further treatment is inappropriate or declined, will still receive worthwhile benefit from the drug(s) if these lower blood pressure. **C**

- *In trials aiming to reduce blood pressure to below 140/90 mmHg using stepped medication regimens, between one-half and three-quarters of patients achieve target blood pressure.*
- *In these trials about one-half of patients needed treatment with more than one drug.*

1.5.2 Patients may become motivated to make lifestyle changes and want to reduce or stop using antihypertensive drugs. If at low cardiovascular risk and with well controlled blood pressure, these patients should be offered a trial reduction or withdrawal of therapy with appropriate lifestyle guidance and ongoing review. **B**

- *When normal blood pressure has been established through drug therapy, the patients most likely to remain normotensive if they stop taking drugs are those*

who are relatively young, with lower on-treatment blood pressure, taking only one drug and who adopt lifestyle changes.

- *Withdrawal of antihypertensive drugs has a much better chance of being successful when supported by structured interventions to encourage patients to restrict their salt intake and to lose weight if they are overweight.*

1.5.3 Patients vary in their attitudes to their hypertension and their experience of treatment. It may be helpful to provide details of patient organisations that provide useful forums to share views and information. **D**

1.5.4 Provide an annual review of care to monitor blood pressure, provide patients with support and discuss their lifestyle, symptoms and medication. **D**

- *Listening to patients' views about the pros and cons of treatment for hypertension, involving patients in each stage of the management of their condition and providing clearly written supportive information is good clinical practice.*

2 Notes on the scope of the guidance

All NICE guidelines are developed in accordance with a scope document that defines what the guideline will and will not cover. The scope of this guideline was established, after a period of consultation, at the start of the guideline development process; it is available from www.nice.org.uk/CG034

This guideline provides recommendations for the care of patients with raised blood pressure. It does not address screening for hypertension, management of hypertension in pregnancy or the specialist management of secondary hypertension (where renal or pulmonary disease, endocrine complications or other disease underlie raised blood pressure). The updated recommendations exclude people with significant comorbidities, people who are unconscious and older people in long-term care facilities.

3 Implementation in the NHS

The Healthcare Commission assesses the performance of NHS organisations in meeting core and developmental standards set by the Department of Health in 'Standards for better health' issued in July 2004. Implementation of clinical guidelines forms part of the developmental standard D2. Core standard C5 says that national agreed guidance should be taken into account when NHS organisations are planning and delivering care.

NICE has developed costing tools to help organisations implement this guidance (listed below). These tools include:

- a costing report to estimate the national savings and costs associated with implementation
- a costing template to estimate the local costs and savings involved.

These are available on our website (www.nice.org.uk/CG034).

Suggested audit criteria based on the key priorities for implementation are listed in appendix D of this document (see page 38), and can be used to audit practice locally.

4 Research recommendations

The Guideline Development Groups have made the following recommendations for research, on the basis of their reviews of the evidence. The Groups regard these recommendations as the most important research areas to improve NICE guidance and patient care in the future. The Guideline Development Groups' full sets of research recommendations are detailed in the full guideline (see section 4).

- The role of ambulatory and home blood pressure monitoring devices in improving patient care and health outcomes. The consequences for resource use (reflecting equipment purchase, maintenance, recalibration, staff, training and medication costs), patient participation in treatment and quality of life. The appropriate use of these devices either as a routine strategy or in self-selecting patients.
- The long-term value of table salt substitutes in lowering blood pressure.
- The long-term value of pragmatic multifaceted lifestyle interventions, including diet, exercise and relaxation, that could be supported by the NHS and other government agencies.
- The validity of cardiovascular risk prediction models in British patient populations, particularly in young people and in ethnic minority groups.
- The presentation of individual benefits and risks of treatment to patients.
- The influence of class of drug on morbidity and mortality in different age and ethnic groups.
- The relationship between thiazide diuretic/beta-blocker co-treatment and new-onset diabetes. Whether all patients are at increased risk or there are specific high-risk groups.
- Determinants of current patterns of care and use of antihypertensive drugs. Methods to improve uptake where it is shown to be sub-optimal.
- The clinical and cost effectiveness of antihypertensive therapies in people younger than 55.
- The clinical effectiveness of antihypertensive therapies in people from minority ethnic groups, particularly black and Asian people.

- The adoption of quality of life measures within future clinical trial protocols of antihypertensive therapy to allow measures of drug class utility.
- The most effective treatment of hypertension resistant to therapy with three blood pressure lowering drugs.

5 Other versions of this guideline

The previous NICE guidance on hypertension (*NICE clinical guideline 18*) was developed by the Newcastle Guideline Development and Research Unit. The National Institute for Health and Clinical Excellence commissioned the update of this guidance from the National Collaborating Centre for Chronic Conditions. The Centre established a Guideline Development Group, which reviewed the evidence and developed the recommendations. The members of the Guideline Development Group are listed in appendix B. Information about the independent Guideline Review Panel is given in appendix C.

The booklet 'The guideline development process – an overview for stakeholders, the public and the NHS' has more information about the Institute's guideline development process. It is available from www.nice.org.uk/guidelinesprocess

5.1 Full guideline

The full guideline, 'Management of hypertension in adults in primary care: partial update', describes the methods and evidence used for updating section 1.4. For details of the evidence for the other recommendations, see the full version of *NICE clinical guideline 18* (www.nice.org.uk/CG018). It is published by the National Collaborating Centre for Chronic Conditions; it is available from www.rcplondon.ac.uk/pubs/books, the NICE website (www.nice.org.uk/CG034fullguideline) and the website of the National Library for Health (www.nlh.nhs.uk).

5.2 Quick reference guide

A quick reference guide for healthcare professionals is also available from the NICE website (www.nice.org.uk/CG034quickrefguide) or from the NHS Response Line (telephone 0870 1555 455; quote reference number N1050).

5.3 Understanding NICE guidance: information for patients and carers

A version of this guideline for people with hypertension and their carers is available from our website (www.nice.org.uk/CG034publicinfo) and the NHS Response Line (telephone 0870 1555 455; quote reference number N1051).

6 Related NICE guidance

Prophylaxis for patients who have experienced a myocardial infarction: drug treatment, cardiac rehabilitation and dietary manipulation. *NICE inherited guideline A* (2001). Available from www.nice.org.uk/guidelineA

Management of type 2 diabetes – management of blood pressure and blood lipids. *NICE inherited guideline H* (2002). Available from www.nice.org.uk/guidelineH

Statins for the prevention of cardiovascular events in patients at increased risk of developing cardiovascular disease or those with established cardiovascular disease. *NICE technology appraisal* no. 94 (2006). Available from www.nice.org.uk/TA094

Cardiovascular risk assessment: the modification of blood lipids for the primary and secondary prevention of cardiovascular disease. *NICE clinical guideline*. Publication expected December 2007. See www.nice.org.uk/guidelines.inprogress.hyperlipidaemiacardiovascular

7 Review date

The process of reviewing the evidence is expected to begin 4 years after the date of issue of this guideline. Reviewing may begin before this if significant evidence that affects the guideline recommendations is identified sooner. The updated guideline will be available within 2 years of the start of the review process.

Appendix A: Grading scheme

Clinical guideline 18

The grading scheme and hierarchy of evidence used to develop the original NICE clinical guideline (that is, all the recommendations except those in section 1.4) are shown in the table below. Please note the full guideline used a different system for grading of the evidence that was being piloted by the Newcastle Guideline Development and Research Unit.

Hierarchy of evidence	
Grade	Type of evidence
Ia	Evidence from a meta-analysis of randomised controlled trials
Ib	Evidence from at least one randomised controlled trial
IIa	Evidence from at least one controlled study without randomisation
IIb	Evidence from at least one other type of quasi-experimental study
III	Evidence from observational studies
IV	Evidence from expert committee reports or experts
Grading of recommendation	
Grade	Evidence
A	Directly based on category I evidence
B	Directly based on category II evidence or extrapolated from category I evidence
C	Directly based on category III evidence or extrapolated from category I or II evidence
D	Directly based on category IV evidence or extrapolated from category I, II or III evidence

Adapted from the Agency for Healthcare Policy and Research (AHCPR) system. US Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research (1992) *Acute pain management: operative or medical procedures and trauma*. Rockville MD: Agency for Health Care Policy and Research Publications.

Update

The grading scheme and hierarchy of evidence used in updating section 1.4 are shown in the tables on pages 31 and 32 (the GREG scheme). This system grades evidence from 'I' (high) to 'III' (low) for each type of study (evaluation of treatment, diagnosis or prognosis) according to a series of quality criteria. It also provides a flexible framework for assessing studies that address the process of care (such as patient surveys) and economic analyses. Research provides robust evidence when it has been conducted to exclude bias, to include suitable populations in adequate numbers, and to measure suitable outcomes. Recommendations reflect the evidence, importance and feasibility of defined steps in the provision of healthcare. Grade A* recommendations indicate a clear basis and conditions for providing (or not providing) a pattern of care. Grade B* means there are important uncertainties that need more careful consideration. Grade C* means that key information is unavailable but that the Guideline Development Group has reached a consensus recommendation based on its shared understanding of the issue.

Guideline recommendation and evidence grading (GREG) scheme for assessing evidence and writing recommendations

EVIDENCE	
Evidence statements provide information about disease, diagnosis and treatment, and are used to support recommendations. Each evidence statement is graded by scoring the study design and applying quality corrections.	
Design	Design scores
Treatment	
Randomised controlled trial	1
Non-randomised controlled study	2
Uncontrolled study	3
Diagnosis	
Blinded cohort study ^a	1
Unblinded cohort study	2
Other design	3
Prognosis	
Incident cohort study ^b	1
Other cohort study	2
Descriptive data	
Population data	1
Representative sample	2
Convenience sample	3
Quality corrections	
Flawed design, conduct or analysis ^c	+1
Imprecise findings ^d	+1
Lack of consistency or independence ^e	+1
Inadequate relevance ^f	+1
Very strong association ^g	-1
Evidence grade	Score
I: High	≤ 1
II: Intermediate	2
III: Low	≥ 3
^a Blinding refers to independent interpretation of a test and reference standard. ^b An incident cohort is identified and followed in time from a defined point in the progress of disease or care. ^c Important flaws may be judged to occur when adequate standards of research are not followed or are unreported in published findings. Potential examples include failure to analyse by intention-to-treat, over-interpretation of secondary analyses, failure to adjust for potential confounding in non-randomised designs. For diagnostic studies this includes the need for an adequate reference standard and to apply different tests in an adequately short timescale. ^d Sparse data (too few events or patients) are the most common reason for imprecision. A confidence interval including both no effect and a clinically important effect is an example of an imprecise finding. ^e Consistency in design: involves methods, patients, outcome measures; and findings: involves homogeneity of summary estimates. Independence refers to the availability of research from at least two independent sources. Evidence of publication bias also denotes lack of consistency. ^f Adequate relevance requires use in studies of a relevant patient-oriented health outcome or a strongly linked surrogate endpoint; and a sufficiently representative and relevant patient group or mix. ^g In comparative designs a very strong association can raise the quality score.	

Recommendations

Recommendations provide guidance about appropriate care. Ideally, these should be based on clear evidence: a robust understanding of the benefits, tolerability, harms and costs of alternative patterns of care. They also need to be feasible in the healthcare setting addressed. There are three categories, and each recommendation may be positive or negative, conditional or unconditional reflecting current evidence and the understanding of the Guideline Development Group.

A*	Recommendation	There is robust evidence to recommend a pattern of care.
B*	Provisional recommendation	On balance of evidence, a pattern of care is recommended with caution.
C*	Consensus opinion	Evidence being inadequate, a pattern of care is recommended by consensus.

Appendix B: The Guideline Development Group

Clinical guideline 18

Ms Susan L Brent

Acting Head of Prescribing Support, Northern and Yorkshire Regional Drug and Therapeutics Centre, Newcastle upon Tyne

Dr Paul Creighton

General Practitioner, Northumberland

Dr William Cunningham

General Practitioner, Northumberland

Dr Heather Dickinson

Technical Support, Newcastle upon Tyne

Dr Julie Eccles (Group Leader)

General Practitioner, Tyne and Wear

Professor Gary Ford

Professor of Pharmacology of Old Age and Consultant Physician, Newcastle upon Tyne

Dr John Harley

General Practitioner, Stockton on Tees

Ms Suzanne Laing

Nurse Practitioner, Tyne and Wear

Professor James Mason

Methodologist and Technical Support, Newcastle upon Tyne

Mr Colin Penney

Patient Representative

Dr Wendy Ross

General Practitioner, Newcastle upon Tyne

Mrs Jean Thurston

Patient Representative

Professor Bryan Williams

Professor of Medicine and Director, Cardiovascular Research Unit, Leicester

Update

Dr Bernard Higgins (Chair)

Consultant Respiratory Physician, Freeman Hospital; Director, National Collaborating Centre for Chronic Conditions

Professor Morris Brown

Professor of Medicine, Cambridge University and Addenbrooke's Hospital; President, British Hypertension Society

Dr Mark Davis

General Practitioner, West Yorkshire; Primary Care Cardiovascular Society

Professor Gary Ford

Consultant Stroke Physician, University of Newcastle and Freeman Hospital; Royal College of Physicians

Mr Colin Penney

Patient and carer representative

Ms Jan Procter-King

Nurse Practitioner, West Yorkshire; Primary Care Cardiovascular Society

Mrs Jean Thurston

Patient and carer representative

Professor Bryan Williams

Clinical Advisor; Professor of Medicine, University of Leicester School of Medicine and University Hospitals Leicester NHS Trust

National Collaborating Centre for Chronic Conditions

Ms Lina Bakhshi

Information Scientist, NCC for Chronic Conditions

Mr Rob Grant

Senior Project Manager, NCC for Chronic Conditions; Medical Statistician,
Royal College of Physicians

Mr Mike Hughes

Health Services Research Fellow in Guideline Development, NCC for Chronic
Conditions

Dr Ian Lockhart

Health Services Research Fellow in Guideline Development, NCC for Chronic
Conditions

Mr Leo Nherera

Health Economist, NCC for Chronic Conditions; Health Economics Fellow,
Queen Mary, University of London

Appendix C: The Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring its quality. The Panel includes experts on guideline methodology, healthcare professionals and people with experience of the issues affecting patients and carers. The members of the Guideline Review Panel were as follows.

Clinical guideline 18

Professor Mike Drummond (Chair)

Director, Centre for Health Economics (CHE), University of York

Dr Kevork Hopayian

General Practitioner, Suffolk

Mr Barry Stables

Patient/Lay Representative

Dr Imogen Stephens

Joint Director of Public Health, Western Sussex Primary Care Trust

Dr Robert Walker

Clinical Director, West Cumbria Primary Care Trust

Update

Dr Peter Rutherford (Chair)

Senior Lecturer in Nephrology, University of Wales College of Medicine

Dr John Harley

General Practitioner, North Tees PCT

Dr Rob Higgins

Consultant in Renal and General Medicine, University Hospitals Coventry and Warwickshire NHS Trust, Coventry

Dr Kevork Hopayian

General Practitioner, Suffolk

Dr Robert Walker

Clinical Director, West Cumbria Primary Care Trust

Appendix D: Technical detail on the criteria for audit

Audit criteria based on key recommendations

The following audit criteria have been developed by the Institute to reflect the key recommendations. They are intended to assist with implementation of the guideline recommendations. The criteria presented are considered to be the key criteria associated with the priorities for implementation.

Criterion	Exception	Definition of terms
<p>Measuring blood pressure</p> <p>1. An individual with a single raised blood pressure reading of more than 140/90 mmHg is asked to return for a minimum of two subsequent clinics where the individual's blood pressure is measured using the best conditions available</p>	None	<p>'Two subsequent clinics' should normally be at monthly intervals.</p> <p>'Best conditions available' includes taking an individual's blood pressure in both arms in a relaxed, temperate setting with the individual quiet and seated and his or her arm outstretched and supported.</p> <p>Clinicians will need to agree locally on how conditions for taking blood pressure are noted for audit purposes.</p>
<p>Cardiovascular risk</p> <p>2. When an individual is identified as having hypertension, a formal cardiovascular risk assessment including the following is carried out:</p> <ol style="list-style-type: none"> medical history physical examination urine strip test for blood and protein blood electrolytes and creatinine blood glucose 	None	<p>'Hypertension' is persistent (or repeated) raised blood pressure more than 140/90 mmHg.</p>

Criterion	Exception	Definition of terms
f. serum total and HDL cholesterol g. 12-lead electrocardiogram		
3. When a cardiovascular risk assessment identifies unusual signs and symptoms or hypertension resistant to drug treatment, the individual is referred for specialist investigation	None	Clinicians should agree locally on the findings of a cardiovascular risk assessment that would indicate the need for referral to a specialist and also the time frame within which a referral is to be made.
Lifestyle interventions 4. An individual in whom hypertension is identified or for whom hypertension is treated is offered lifestyle advice at the following times: a. initially b. periodically	None	<p>'Lifestyle advice' includes the following: advice on diet; regular exercise; relaxation therapies such as stress management, meditation, cognitive therapies, muscle relaxation and biofeedback; reducing intake of alcohol if a man drinks > 21 units or a woman drinks > 14 units a week; reducing consumption of coffee if an individual drinks > 5 cups a day or caffeine-rich drinks; keeping dietary sodium (salt) intake low and smoking.</p> <p>Clinicians will need to agree locally on how lifestyle advice is documented, for audit purposes.</p> <p>'Initially' means at the time hypertension is diagnosed.</p> <p>Clinicians need to agree locally on the periodic basis on which lifestyle advice is offered.</p>

Criterion	Exception	Definition of terms
<p>Pharmacological interventions</p> <p>5. Patients newly diagnosed with essential hypertension who either:</p> <ul style="list-style-type: none"> a. have persistent high blood pressure of 160/100 mmHg or more, or b. are at raised cardiovascular risk with persistent blood pressure of more than 140/90 mmHg <p>are offered drug therapy</p>		<p>Raised cardiovascular risk is defined as a 10-year risk of CVD \geq 20% or existing cardiovascular disease or target organ damage.</p>
<p>6. Patients newly diagnosed with essential hypertension who are aged 55 or older, or black and any age, are offered a calcium-channel blocker or a thiazide-type diuretic as the first choice for initial drug therapy</p>	None	<p>Black patients are those of African or Caribbean descent, and not mixed race, Asian or Chinese patients</p>
<p>7. Patients newly diagnosed with essential hypertension who are younger than 55, and not black, are offered an ACE inhibitor (or angiotensin-II receptor antagonist if ACE inhibitor is not tolerated)</p>	None	

Criterion	Exception	Definition of terms
<p>Continuing treatment</p> <p>8. There is an annual review of care for an individual whose hypertension is in control</p>	None	<p>'Annual review' includes monitoring of blood pressure, provision of support and discussion of lifestyle, symptoms and medication.</p> <p>Clinicians will need to agree locally on how an annual review of an individual with hypertension is documented for audit purposes.</p>
<p>9. An individual who has no existing cardiovascular disease and has well-controlled blood pressure who wishes to reduce or stop using drugs is offered a trial reduction or withdrawal of therapy</p>	None	<p>'A trial reduction or withdrawal of therapy' includes evidence of careful follow-up, appropriate lifestyle guidance and monitoring.</p> <p>Clinicians will need to agree locally on how follow-up and monitoring of people who have reduced or stopped taking drugs will be documented for audit purposes.</p>

Routine data collection

A series of general practice database queries were identified as part of the process of guideline development: these data can be routinely captured using the MIQUEST system. MIQUEST is funded by the NHS Information Authority and is the recommended method of expressing queries and extracting data from different types of practice systems.

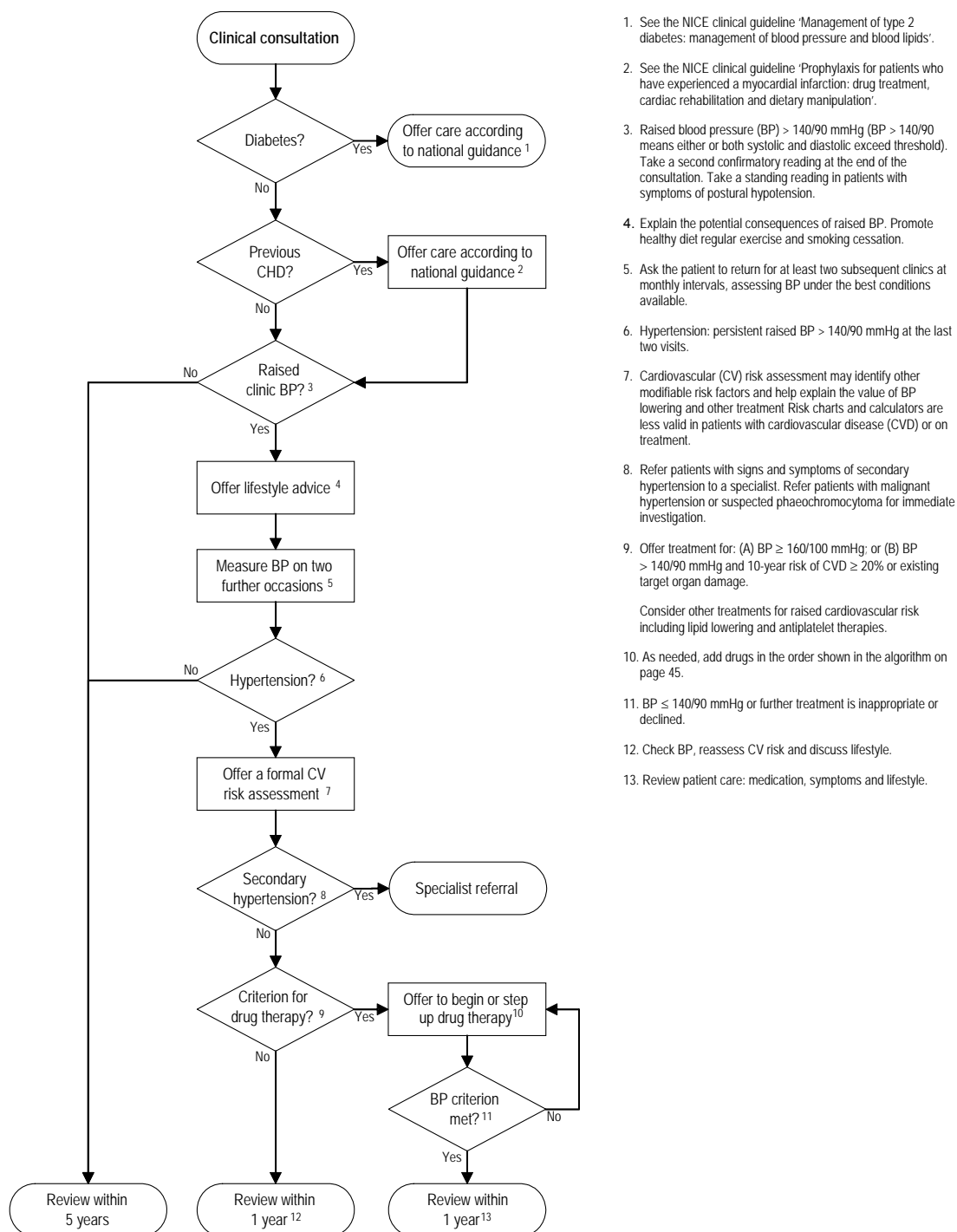
1. Number of patients with (and practice prevalence of) persistent raised blood pressure.
2. Proportion of patients in (1) with a previously completed cardiovascular risk assessment.
3. Proportion of patients in (1) given lifestyle advice in the past year including (as appropriate) smoking cessation, diet and exercise.

4. Proportion of patients in (1) prescribed a thiazide-type diuretic in the past 6 months.
5. Proportion of patients in (1) prescribed a beta-blocker in the past 6 months.
6. Proportion of patients in (1) prescribed an ACE-inhibitor in the past 6 months.
7. Proportion of patients in (1) prescribed a calcium-channel blocker in the past 6 months.
8. Proportion of patients in (1) prescribed an angiotensin receptor blocker in the past 6 months.
9. Proportion of patients in (1) prescribed another antihypertensive drug in the past 6 months.
10. Proportion of patients in (1) prescribed no medication in the past 6 months.
11. Proportion of patients in (10) with recorded refusal to accept medication.
12. Proportion of patients in (1) prescribed aspirin in the past 6 months.
13. Proportion of patients in (1) prescribed an alternative antiplatelet in the past 6 months.
14. Proportion of patients in (1) prescribed a statin in the past 6 months.
15. Proportion of patients in (1) prescribed an alternative lipid reducing agent in the past 6 months.
16. Proportion of patients in (1) with latest systolic BP reading less than or equal to 140 mmHg.
17. Proportion of patients in (1) with latest diastolic BP reading less than or equal to 80 mmHg.

18. Proportion of patients in (1) with latest systolic BP reading less than or equal to 140 mmHg and diastolic BP reading less than or equal to 80 mmHg.
19. Proportion of patients in (1) without a BP reading in the past year.

Appendix E: Management flowchart for hypertension

Flowcharts cannot capture all the complexities and permutations affecting the clinical care of individuals managed in general practice. This flowchart is designed to help communicate the key steps, but is not intended for rigid use or as a protocol. Guidance on drug sequencing can provide a useful starting point but antihypertensive drug therapy will need adapting to individual patient response and experience.



1. See the NICE clinical guideline 'Management of type 2 diabetes: management of blood pressure and blood lipids'.
2. See the NICE clinical guideline 'Prophylaxis for patients who have experienced a myocardial infarction: drug treatment, cardiac rehabilitation and dietary manipulation'.
3. Raised blood pressure (BP) > 140/90 mmHg (BP > 140/90 means either or both systolic and diastolic exceed threshold). Take a second confirmatory reading at the end of the consultation. Take a standing reading in patients with symptoms of postural hypotension.
4. Explain the potential consequences of raised BP. Promote healthy diet regular exercise and smoking cessation.
5. Ask the patient to return for at least two subsequent clinics at monthly intervals, assessing BP under the best conditions available.
6. Hypertension: persistent raised BP > 140/90 mmHg at the last two visits.
7. Cardiovascular (CV) risk assessment may identify other modifiable risk factors and help explain the value of BP lowering and other treatment. Risk charts and calculators are less valid in patients with cardiovascular disease (CVD) or on treatment.
8. Refer patients with signs and symptoms of secondary hypertension to a specialist. Refer patients with malignant hypertension or suspected pheochromocytoma for immediate investigation.
9. Offer treatment for: (A) BP \geq 160/100 mmHg; or (B) BP > 140/90 mmHg and 10-year risk of CVD \geq 20% or existing target organ damage.
Consider other treatments for raised cardiovascular risk including lipid lowering and antiplatelet therapies.
10. As needed, add drugs in the order shown in the algorithm on page 45.
11. BP \leq 140/90 mmHg or further treatment is inappropriate or declined.
12. Check BP, reassess CV risk and discuss lifestyle.
13. Review patient care: medication, symptoms and lifestyle.

Choosing drugs for patients newly diagnosed with hypertension

Abbreviations:

A = ACE inhibitor
 (consider angiotensin-II receptor antagonist if ACE intolerant)
 C = calcium-channel blocker
 D = thiazide-type diuretic

Black patients are those of African or Caribbean descent, and not mixed-race, Asian or Chinese patients

Beta-blockers are not a preferred initial therapy for hypertension but are an alternative to A in patients younger than 55 years in whom A is not tolerated or is contraindicated (including women of childbearing potential)

