NHS

National Institute for Clinical Excellence

Hypertension

Management of hypertension in adults in primary care

Clinical Guideline 18
August 2004

Developed by the Newcastle Guideline Development and Research Unit

Clinical Guideline 18
Hypertension: management of hypertension in adults in primary care

Issue date: August 2004

This document, which contains the Institute's full guidance on the management of hypertension in adults in primary care, is available from the NICE website (www.nice.org.uk/CG018NICEguideline).

An abridged version of this guidance (a 'quick reference guide') is also available from the NICE website (www.nice.org.uk/CG018quickrefguide). Printed copies of the quick reference guide can be obtained from the NHS Response Line: telephone 0870 1555 455 and quote reference number N0692.

Information for the Public is available from the NICE website or from the NHS Response Line (quote reference number N0693 for a version in English and N0694 for a version in English and Welsh).

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. Health professionals are expected to take it fully into account when exercising their clinical judgement. The guidance does not, however, override the individual responsibility of health 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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The quick reference guide for this guideline has been distributed to the following:

- Primary care trust (PCT) chief executives
- Local health board (LHB) chief executives
- NHS trust chief executives in England and Wales
- Strategic health authority chief executives in England and Wales
- Medical and nursing directors in England and Wales
- Clinical governance leads in England and Wales
- Audit leads in England and Wales
- NHS trust, PCT and LHB libraries in England and Wales
- Patient advice and liaison coordinators in England
- GPs in England and Wales
- Chief pharmacists, heads of drug purchasing, heads of drug information, GP prescribing advisors and purchase advisors in England and Wales
- Prison healthcare managers in England
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Contents

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 multi-disciplinary 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.

Key priorities for implementation

The following 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 their blood pressure is assessed from two readings using 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 CHD ≥ 15% or CVD ≥ 20% or existing cardiovascular disease or target organ damage) with persistent blood pressure of more than 140/90 mmHg.
- Drug therapy should normally begin with a low-dose thiazide-type diuretic. If necessary, second line add a beta-blocker unless patient is at raised risk of new-onset diabetes, in which case add an angiotensin converting enzyme (ACE)-inhibitor. Third line, add a dihydropyridine calcium-channel blocker. (See point 10 in the management flowchart for more information.)

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). Please note that the grading scheme for evidence used in the NICE guideline (Appendix A) differs from that used in the full guideline.

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 sodium intake to less than 6.0 g/day 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. http://www.nice.org.uk/page.aspx?o=30590*

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

1.4.1 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 CHD ≥ 15% or CVD ≥ 20% or existing cardiovascular disease or target organ damage) with persistent blood pressure of more than 140/90 mmHg. **A**

    - *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 Drug therapy should normally begin with a low-dose thiazide-type diuretic[+]. If necessary, second line add a beta-blocker unless a patient is at raised risk of new-onset diabetes*, in which case add an ACE-inhibitor. Third line, add a dihydropyridine calcium-channel blocker. (See point 10 in the management flowchart for more information.) **A**

[+] *In younger patients, aged under 55, with moderately raised blood pressure and who may be managed on one drug, consider beginning with a beta-blocker.*

** Patients are considered at a raised risk of new-onset diabetes with a strong family history of type 2 diabetes, impaired glucose tolerance (FPG ≥ 6.5 mmol/l), if clinically obese (BMI ≥ 30) or of South-Asian or African-Caribbean ethnic origin.*

- *Findings from trials suggest that the onset of diabetes is greater in patients receiving a combination of a thiazide-type diuretic and beta-blocker when*

compared with other drug combinations. The combination may lead to a higher incidence of diabetes of 0.4% per year of treatment, that is, one additional case of diabetes for 250 patients treated every year.

- *From a model of lifetime costs and effects, based on the findings of trials, treatment using stepped care including thiazide diuretics, beta-blockers, ACE-inhibitors, angiotensin receptor blockers and calcium-channel blockers is estimated to be cost effective.*

1.4.5 Concern about increased new-onset diabetes among patients prescribed a thiazide-type diuretic with a beta-blocker means that this is not recommended as an initial combination for patients at raised risk of developing type 2 diabetes. However, the combination may become appropriate to manage treatment-resistant hypertension or if cardiovascular disease develops. **A**

1.4.6 If further blood pressure lowering is warranted, consider adding an ACE-inhibitor or beta-blocker (if not yet used), another antihypertensive drug, or referring to a specialist. **A**

- *As a whole, head-to-head studies indicate similar benefits irrespective of whether blood pressure management begins with a low-dose thiazide-type diuretic, beta-blocker, calcium-channel blocker, ACE-inhibitor or angiotensin receptor blocker*.

- *Thiazide-type diuretics, beta-blockers, calcium-channel blockers, ACE-inhibitors and angiotensin receptor blockers appear similarly well tolerated as assessed by overall trial withdrawal rates. Withdrawal occurs typically at rates of 5% to 10% per year.*

- *Current evidence does not support the use of alpha-blockers for initial treatment of raised blood pressure.*

- *There is no evidence from large-scale trials to support the use of centrally acting antihypertensive drugs for the initial treatment of raised blood pressure.*

1.4.7 Consider substituting an angiotensin receptor blocker in patients who do not tolerate an ACE-inhibitor because of cough. **A**

- *Trials of up to 1 year duration show reduced treatment-related cough in patients taking an angiotensin receptor blocker when compared with an ACE-inhibitor.*

1.4.8 At review, consider modifying the medication of patients currently using only a thiazide-type diuretic and beta-blocker and at raised risk of diabetes, and those in whom concern about their treatment may affect adherence. **A**

- *Concerns do not justify routinely changing the medication of patients treated currently with a thiazide-type diuretic and beta-blocker, and for whom continued blood pressure control is paramount. Changing therapy risks new side effects and it may take time to re-establish adequate control of blood pressure. A change of therapy is unlikely to be appropriate in patients on three or more antihypertensive drugs.*

1.4.9 Offer treatment as described to patients regardless of age and ethnicity. Be prepared to tailor drug therapy for individual patients who do not respond to the sequence of drugs indicated. **B**

- *There is no compelling evidence in terms of reduced risk of cardiovascular disease to support the belief that different classes of drug work better in older or younger patients.*

- *There is evidence from short-term studies of differential blood pressure lowering from certain drugs in the young and old and in certain ethnic groups. ACE-inhibitors and beta-blockers, whose mechanism of action is to suppress renin production, may not be effective in lowering blood pressure in patients of African descent, when used as monotherapy. However, these agents may be effective in combination with a thiazide diuretic.*

- *One large randomised controlled trial (ALLHAT) found that ACE-inhibitors, used first line, may not prevent stroke in patients of African descent as effectively as low-dose thiazide-type diuretics.*

1.4.10 Offer patients with isolated systolic hypertension (systolic BP $\geq$ 160 mmHg) 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.*

1.4.11 Offer patients over 80 years of age the same treatment as younger patients, 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.*

1.4.12 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% vs 83%). Similarly, once-daily regimens were better adhered to than twice-daily regimens (93% vs 87%).*

1.4.13 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 at the start of the development of this guideline, following a period of consultation; it is available from http://www.nice.org.uk/article.asp?a=24839

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).

3 Implementation in the NHS

3.1 In general

The implementation of this guideline will build on the National Service Frameworks for Coronary Heart Disease and Older People in England and Wales and should form part of the service development plans for each local health community in England and Wales.

Local health communities should review their existing practice for the management of people with hypertension against this guideline. The review should consider the resources required to implement the recommendations set out in Section 1, the people and processes involved and the timeline over which full implementation is envisaged. It is in the interests of patients that the implementation timeline is as rapid as possible.

Relevant local clinical guidelines, care pathways and protocols should be reviewed in the light of this guidance and revised accordingly.

The Faculty of Public Health has developed a Hypertension Toolkit. The aim of the Hypertension Toolkit is to provide local health improvement partnerships with the essential building-blocks to develop an effective programme for the prevention and control of hypertension. The toolkit

describes the public health burden of hypertension, how to make the case for action and further information to help develop local strategies on hypertension. The target audience includes strategic planners in the NHS and local government, members of local strategic partnerships and primary care professionals.

3.2 Audit

Suggested audit criteria are listed in Appendix D. These can be used as the basis for local clinical audit, at the discretion of those in practice.

4 Research recommendations

The following research recommendations have been identified for this NICE guideline.

- 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 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.

5 Other versions of this guideline

Full guideline

The National Institute for Clinical Excellence commissioned the development of this guidance from the Newcastle Guideline Development and Research Unit. The Unit established a Guideline Development Group, which reviewed the evidence and developed the recommendations. The full guideline, 'Essential hypertension: managing adult patients in primary care', can be obtained in hard copy from the Centre for Health Services Research, University of Newcastle upon Tyne (telephone 0191 222 7045), and electronically from the NICE website (www.nice.org.uk) and the website of the National Electronic Library for Health (www.nelh.nhs.uk).

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 the Institute's website and copies can also be ordered by telephoning 0870 1555 455 (quote reference N0472).

Information for the public

A version of this guideline for people with hypertension and for the public is available from the NICE website (www.nice.org.uk/CG018publicinfo) or from the NHS Response Line (0870 1555 455; quote reference number N0693 for an English version and N0694 for an English and Welsh version). This is a good starting point for explaining to patients the kind of care they can expect.

Quick reference guide

A quick reference guide for healthcare professionals is also available from the NICE website (www.nice.org.uk/CG018quickrefguide) or from the NHS Response Line (0870 1555 455; quote reference number N0692).

6 Related NICE guidance

Prophylaxis for patients who have experienced a myocardial infarction: drug treatment, cardiac rehabilitation and dietary manipulation. *NICE Inherited Guideline A* (April 2001). Available from www.nice.org.uk/page.aspx?o=20053

Management of type 2 diabetes – management of blood pressure and blood lipids. *NICE Inherited Guideline H* (October 2002). Available from www.nice.org.uk/page.aspx?o=38551

Statins for the prevention of coronary events. Ongoing NICE Technology Appraisal.

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 earlier than 4 years 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

The grading scheme and hierarchy of evidence used in this guideline 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.

Appendix B: The Guideline Development Group

The members of the Guideline Development Group are (in alphabetical order):

Ms Susan L Brent
Acting Head of Prescribing Support, Northern & Yorkshire Regional Drug & 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 & 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 & Wear

Professor James Mason
Methodologist and Technical Support, Newcastle upon Tyne

Mr Colin Penney
Patient Representative, Derbyshire

Dr Wendy Ross
General Practitioner, Newcastle upon Tyne

Mrs Jean Thurston

Patient Representative, Tyne & Wear

Professor Bryan Williams

Professor of Medicine and Director, Cardiovascular Research Unit, Leicester

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, health professionals and people with experience of the issues affecting patients and carers. The members of the Guideline Review Panel were as follows.

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

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
Measuring blood pressure 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.	None	'Two subsequent clinics' should normally be at monthly intervals. '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. Clinicians will need to agree locally on how conditions for taking blood pressure are noted for audit purposes.
Cardiovascular risk 1. When an individual is identified as having hypertension, a formal cardiovascular risk assessment including the following is carried out: a. medical history b. physical examination c. urine strip test for blood and protein d. blood electrolytes and creatinine e. blood glucose f. serum total and HDL	None	'Hypertension' is persistent (or repeated) raised blood pressure more than 140/90 mmHg.

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	'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. Clinicians will need to agree locally on how lifestyle advice is documented, for audit purposes. 'Initially' means at the time hypertension is diagnosed. Clinicians need to agree locally on the periodic basis on which lifestyle advice is offered.
Pharmacological interventions 5. An individual is offered low-dose thiazide-type	a. The individual is prescribed a beta-blocker when the individual does not	'Raised cardiovascular risk' means 10-year risk of CHD ≥ 15% or CVD ≥ 20% or existing cardiovascular disease or target

diuretic if s/he has the following: a. persistent high blood pressure of 160/100 mmHg or more **and** b. raised cardiovascular risk with persistent blood pressure of more than 140/90 mmHg.	tolerate low-dose thiazide diuretic or when treatment with low-dose thiazide diuretic is not effective, unless the individual is at raised risk of new-onset diabetes, in which case an ACE-inhibitor is prescribed.	organ damage. 'Raised risk of new-onset diabetes' means a strong family history of type 2 diabetes, impaired glucose tolerance (FPG ≥ 6.5 mmol/l, clinically obese (BMI ≥ 30) or of South-Asian or African-Caribbean ethnic origin. Clinicians will need to agree locally on how raised cardiovascular risk is documented for audit purposes.
6. An individual is offered the following drug therapy if further blood pressure lowering is warranted: a. an ACE-inhibitor and a calcium-channel blocker as needed, for an individual who was prescribed thiazide diuretic **or** b. a calcium-channel blocker and an ACE-inhibitor as needed, for an individual who was prescribed a beta-blocker.	A. The individual who is intolerant of an ACE-inhibitor is offered an angiotensin receptor blocker.	Clinicians will need to agree locally on any time frames within which additional drug therapy is offered, for audit purposes.
Continuing treatment 7. There is an annual review of care for an individual whose hypertension is in control.	None	'Annual review' includes monitoring of blood pressure, provision of support and discussion of lifestyle, symptoms and medication. Clinicians will need to agree locally on how an annual review of an individual with hypertension is

		documented for audit purposes.
8. 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.	None	'A trial reduction or withdrawal of therapy' includes evidence of careful follow-up, appropriate lifestyle guidance and monitoring. 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.

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 (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 last year including (as appropriate) smoking cessation, diet and exercise.

4. Proportion of patients in (1) prescribed a thiazide in the last 6 months.

5. Proportion of patients in (1) prescribed a beta-blocker in the last 6 months.

6. Proportion of patients in (1) prescribed an ACE-inhibitor in the last 6 months.

7. Proportion of patients in (1) prescribed a calcium-channel blocker in the last 6 months.

8. Proportion of patients in (1) prescribed an angiotensin receptor blocker in the last 6 months.

9. Proportion of patients in (1) prescribed another antihypertensive drug in the last 6 months.

10. Proportion of patients in (1) prescribed no medication in the last 6 months.

11. Proportion of patients in (10) with recorded refusal to accept medication.

12. Proportion of patients in (1) prescribed aspirin in the last 6 months.

13. Proportion of patients in (1) prescribed an alternative antiplatelet in the last 6 months.

14. Proportion of patients in (1) prescribed a statin in the last 6 months.

15. Proportion of patients in (1) prescribed an alternative lipid reducing agent in the last 6 months.

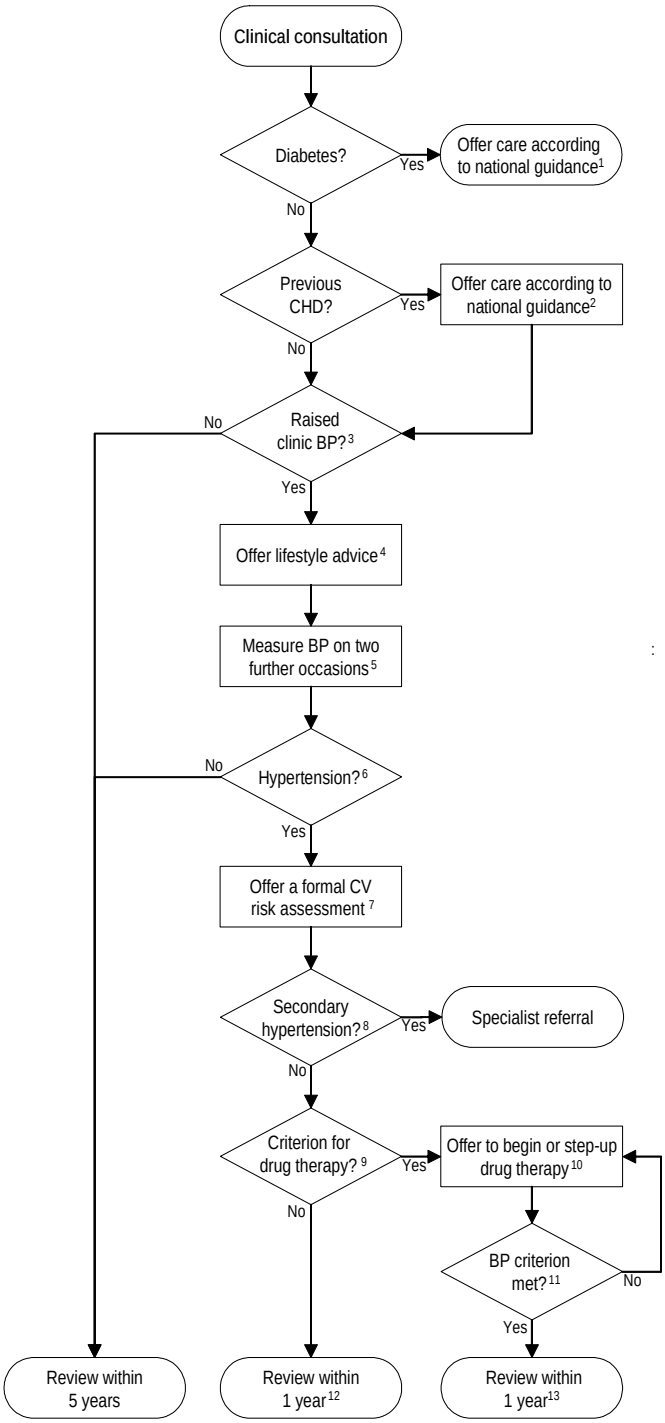
16. Proportion of patients in (1) with latest systolic BP reading less than or equal to 140 mmHg.

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 last year.

Appendix E: Management flowchart for hypertension*



1 See the NICE Guideline 'Management of type 2 diabetes – management of blood pressure and blood lipids'.

2 See the NICE 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.

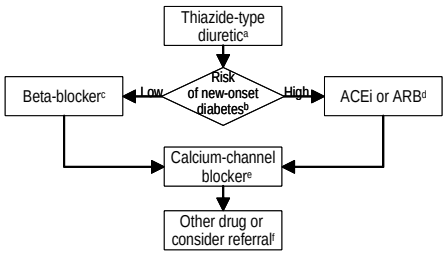
8 Refer patients with signs and symptoms of secondary hypertension to a specialist. Refer patients with malignant hypertension or suspected pheochromocytoma for immediate investigation.

9 Offer treatment for: (A) BP ≥ 160/100 mmHg; or (B) BP > 140/90 mmHg and (10-year coronary heart disease [CHD] risk ≥ 15%, CVD risk ≥ 20% or existing CVD or target organ damage).

Consider other treatments for raised cardiovascular risk including lipid lowering and antiplatelet therapies.

10 As needed, add drugs in the following order*.

:



*If a drug is not tolerated discontinue and proceed to the next line of therapy. If a drug is tolerated but target BP is not achieved add the next line of therapy. Drug cautions and contraindications are listed fully in the *British National Formulary*.

a In young patients (under 55) whose BP may be managed on monotherapy, consider starting with a beta-blocker.

b Patients at high risk have a strong family history of type 2 diabetes, have impaired glucose tolerance (FPG ≥ 6.5 mmol/l), are clinically obese (body mass index ≥ 30) or are of South-Asian or African-Caribbean ethnic origin.

c Beta-blocker contraindications include asthma, COPD and heart block.

d Offer an angiotensin receptor blocker (ARB) if an angiotensin converting enzyme inhibitor (ACEi) is not tolerated because of cough. Contraindications include known or suspected renovascular disease and pregnancy.

e Only dihydropyridine calcium-channel blockers should be prescribed with a beta-blocker. Contraindications include heart failure.

f Consider offering a beta-blocker or ACEi (if not yet used), another drug or specialist referral. A beta-blocker and thiazide-type diuretic combination may become necessary in patients at high risk of developing diabetes if hypertension or CVD progresses.

11 BP ≤ 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.

* 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.