This management plan is only a guideline and is not intended to serve as a standard of medical care or be applicable in every situation. Decisions regarding the treatment of individual patients must be made by the clinician in light of that patient’s presenting clinical condition and with reference to current good medical practice.
### Consultation and Change Record

<table>
<thead>
<tr>
<th><strong>Contributing Authors:</strong></th>
<th>Dr Leslie Cruickshank and Dr J Spratt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consultation Process:</strong></td>
<td>By email consultation and presentation at Primary Care Prescribing Group and the following: Dr John Doig and Dr Chris Kelly</td>
</tr>
<tr>
<td><strong>Distribution:</strong></td>
<td>GPs, PNs</td>
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</tbody>
</table>

**Change Record**
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**Hypertension Flowchart**

**THRESHOLDS FOR INTERVENTION**
Initial blood pressure (mmHg)

- **Initial blood pressure (mmHg)**
  - 160-179
    - 100-109
  - 140-159
    - 90-99
  - 130-139
    - 85-89
  - **<130/85**

- **>180/110**
  - Treat

- **≥160/100**
  - Target organ damage or cardiovascular complications or diabetes or 10 year CVD risk >20%
  - Reassess yearly

- **140-159/90-99**
  - No target organ damage and no cardiovascular complications and no diabetes and 10 year CVD risk < 20%
  - Reassess in 5 years

- **<140/90**
  - Reassess yearly

---

**Unless malignant phase of hypertensive emergency confirm over 1-2 weeks then treat.**

**If cardiovascular complications, target organ damage or diabetes is present, confirm over 3-4 weeks then treat. If absent, re-measure weekly and treat if blood pressure persists at these levels over 4-12 weeks.**

***If cardiovascular complications, target organ damage or diabetes is present, confirm over 12 weeks then treat. If absent, re-measure monthly and treat if these levels are maintained and if estimated 10 year CVD risk is >20%.**

**If B.P. > 220/120 treat immediately.**
BLOOD Pressure & vascular risk

It is important to appreciate that increased blood pressure is associated with increased vascular risk. This is a continuum of risk, with no clearly defined lower limit. It thereby follows (and has been demonstrated by a plethora of studies) that lowering blood pressure will lower vascular risk. In determining who and how aggressively to treat a baseline assessment of vascular risk must therefore be made. If vascular risk is high a lower blood pressure target may be preferable.

TARGET BLOOD PRESSURE

<table>
<thead>
<tr>
<th></th>
<th>Diabetic* or CKD</th>
<th>Non-diabetic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Optimal</strong></td>
<td>&lt;130/&lt;80</td>
<td>&lt;140/&lt;85</td>
</tr>
<tr>
<td><strong>Acceptable</strong></td>
<td>&lt;140/&lt;80</td>
<td>&lt;150/&lt;90</td>
</tr>
</tbody>
</table>

* For Type 1 diabetes with nephropathy lower targets apply (120/70) and specialist care may be appropriate.

CKD = Chronic Kidney Disease

Complications of Hypertension/Target Organ Damage

- Ischaemic heart disease
- Cerebrovascular disease
- Heart Failure.
- Peripheral Vascular Disease
- Fundal haemorrhages or exudates / papillodema
- Proteinuria
- Chronic renal failure

Hypertension Guideline

Frequency of screening / monitoring

All adult patients should have their blood pressure checked at least once every 5 years. Any patient with a high normal blood pressure reading (SBP 130-139mmHg or DBP 85-89mmHg) at any time should have subsequent checks at least once a year. Patients on medication for hypertension should have their blood pressure checked at least once every six months.
Measuring blood pressure

Detailed guidance is available in the British Hypertension Society guidelines, BHS IV, 2004.

- Sphygmomanometers must be properly maintained, validated and calibrated.
- Remove tight clothing, support arm at heart level, ensure hand relaxed and avoid talking during measurement procedure
- Bladder cuff size must be appropriate for arm circumference.
- Blood pressure should be measured to the nearest 2mm Hg.
- Diastolic blood pressure should be recorded as disappearance of the sounds (phase V).
- At least 2 measurements should be made at each visit and the mean taken.
- Blood pressure should initially be measured in both arms as patients may have large differences (>10mmHg) between arms. The arm with the higher values should be used for subsequent measurement.

Diagnosis
See Hypertension Flowchart and Box 1.

Box 1. British Hypertension Society classification of blood pressure levels

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic blood pressure (mmHg)</th>
<th>Diastolic blood pressure (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal blood pressure</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Normal blood pressure</td>
<td>&lt;130</td>
<td>&lt;85</td>
</tr>
<tr>
<td>High-normal blood pressure</td>
<td>130-139</td>
<td>85-89</td>
</tr>
<tr>
<td>Grade 1 hypertension (mild)</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Grade 2 hypertension (moderate)</td>
<td>160-179</td>
<td>100-109</td>
</tr>
<tr>
<td>Grade 3 hypertension (severe)</td>
<td>( \geq 180 )</td>
<td>( \geq 110 )</td>
</tr>
<tr>
<td>Isolated systolic hypertension (Grade 1)</td>
<td>140-159</td>
<td>&lt;90</td>
</tr>
<tr>
<td>Isolated systolic hypertension (Grade 2)</td>
<td>( \geq 160 )</td>
<td>&lt;90</td>
</tr>
</tbody>
</table>

If systolic blood pressure and diastolic blood pressure fall into different categories, the higher value should be taken for classification.

Exclude drug induced causes – NSAIDs, oral contraceptives, steroids, sympathomimetics ie some cold cures, liquorice.
Cardiovascular Disease (CVD) Risk Assessment

The Joint British Societies Cardiac Risk Prediction Charts now predict 10 year CVD risk (combined fatal and non-fatal stroke and CHD). The only threshold emphasised in the charts is 20% 10-year CVD risk. See BNF for current charts.

CVD risk replaces CHD risk estimation to reflect the importance of stroke prevention as well as CHD prevention. The new CVD risk threshold of \( \geq 20\% \) is equivalent to a CHD risk of approximately \( \geq 15\% \) over 10 years.

This is no longer a separate chart for people with diabetes as the need for risk estimation among this patient group is rarely required. All patients with diabetes aged greater than 50 years or diagnosed for 10 years have the equivalent risk as those who have suffered an MI.

Investigations

The following should be carried out before or at the time of instigation of treatment –

- An ECG looking for evidence of left ventricular hypertrophy. Those with signs of LVH on ECG should be referred for an open access Echocardiogram.
- Urine strip test for protein and blood.
- Serum creatinine and electrolytes (repeated annually if on relevant drug therapy).
- Blood glucose - ideally fasted.
- Lipid profile - ideally fasted.

Interventions

Non-pharmacological

1. **Lifestyle modifications for the primary prevention of hypertension.**

   - **Maintain ideal body mass index** (20-25kg/m\(^2\)) Potential drop in systolic BP of 5-10mmHg per 10kg weight loss.
   - **Reduced salt in diet** – reducing dietary salt intake to < 6g sodium chloride (6g =approx 1 teaspoon) per day reduces systolic BP by about 2-8 mmHg. Advise not adding salt at the table and reducing intake of processed foods.
   - **DASH eating plan.** Dietary Approaches to Stop Hypertension. Consume diet rich in fruit and vegetables (At least 5 portions per day), low-fat dairy products with reduced content of saturated and total fat. Expected systolic BP reduction 6 mmHg.
   - **Limit alcohol consumption** - intake of more than 21 units per week is associated with reversible elevation of blood pressure, binge-drinking is associated with an increase risk of stroke – recommended limits are no more than 3 units per day for men and 2 units per day for women. Consumption of smaller amounts of alcohol up to the recommended limits may protect against CHD and should not be discouraged.
• **Physical activity** – regular aerobic physical activity such as brisk walking (≥ 30 mins per day, most days of the week).

2. **Measures that reduce cardiovascular risk:**

   • **Stop smoking** – the use of nicotine replacement therapies approximately doubles smoking cessation rates but should always be used in combination with motivational counselling.
   • **Reduced total fat and saturated fat intake**
   • **Replacement of saturated fats with mono-unsaturated fats**
   • **Increased oily fish consumption**

**Pharmacological Treatment**

Meta analyses of BP lowering trials have confirmed that, in general, the main determinant of benefit from BP lowering drugs is the achieved BP rather than the choice of therapy. Most people with high BP will require at least 2 BP lowering drugs to achieve targets.

Choice of therapy should take into account specific indications and contraindications for individual drugs and individual patients (see table 1).
<table>
<thead>
<tr>
<th>Class of drug</th>
<th>Compelling indications</th>
<th>Possible indications</th>
<th>Cautions</th>
<th>Compelling contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha-blocker</td>
<td>Benign prostatic hypertrophy</td>
<td></td>
<td>Postural hypotension, heart failure&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Urinary incontinence</td>
</tr>
<tr>
<td>ACE Inhibitors</td>
<td>Heart failure, LV dysfunction, post MI or established CHD, type I diabetic</td>
<td>Chronic renal disease, Type II diabetic nephropathy, proteinuric renal disease, atrial</td>
<td>Renal impairment&lt;sup&gt;b&lt;/sup&gt; PVD&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Pregnancy Renal artery stenosis&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>ACE inhibitor intolerance, type II diabetic nephropathy, hypertension with LVH, heart failure</td>
<td>LV dysfunction post MI, atrial fibrillation; left ventricular hypertrophy Intolerance of other</td>
<td>Renal impairment&lt;sup&gt;b&lt;/sup&gt; PVD&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Pregnancy Renal artery stenosis&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Beta-blockers</td>
<td>Myocardial infarction, Angina; Heart failure&lt;sup&gt;f&lt;/sup&gt;</td>
<td>Elderly, ISH, heart failure, 2&lt;sup&gt;o&lt;/sup&gt; stroke prevention</td>
<td>Heart failure&lt;sup&gt;f&lt;/sup&gt; PVD, diabetes (except with CHD);</td>
<td>Heart failure&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>elderly, Angina</td>
<td>Elderly, Angina, ISH</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>Heart block</td>
</tr>
<tr>
<td>Thiazides/thiazide-like diuretics</td>
<td>Elderly, ISH, heart failure, 2&lt;sup&gt;o&lt;/sup&gt; stroke prevention</td>
<td>Diabetes mellitus Esp when used in conjunction</td>
<td>Heart failure&lt;sup&gt;f&lt;/sup&gt; PVD, diabetes (except with CHD);</td>
<td>-</td>
</tr>
</tbody>
</table>

**CCB** = calcium channel blocker  
**ISH** = isolated systolic hypertension  
**PVD** = peripheral vascular disease  
**MI** = myocardial infarction  
<sup>a</sup> HF when used as monotherapy.

**ACE** = angiotensin-converting enzyme  
**ARBs** = angiotensin II receptor blockers

**LVH** = left ventricular hypertrophy

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*Table 1: Choice of Treatment*
b. ACE inhibitors or ARBs may be beneficial in chronic renal failure but should be used with caution, close supervision and specialist advice when there is established and significant renal impairment.

c. Caution with ACE inhibitors and ARBs in peripheral vascular disease because of association with renovascular disease.

d. ACE inhibitors and ARBs are sometimes used in patients with renovascular disease under specialist supervision.

e. In combination with a thiazide/thiazide-like diuretic.

f. Beta blockers are used to treat stable heart failure. However, beta blockers may worsen heart failure.

g. Thiazide and thiazide-like diuretics may sometimes be necessary to control BP in people with a history of gout, ideally used in combination with allopurinol.

When none of the special considerations listed in table 2 apply initial drug selection should follow step 1 of the A/CD algorithm

**ACE inhibitors/ARBs and renal impairment**

ACE inhibitors/ARBs should be stopped if there is an eGFR fall > 15% or creatinine rise > 20% from initiation. If in doubt seek specialist advice.

ACE inhibitors/ARBs should be stopped during any episode of vomiting and/or diarrhoea until resolved.

The role of ambulatory blood pressure monitoring

Ambulatory monitoring has been shown to provide a better estimate of vascular risk and as such should be considered as a method of additional risk stratification in patient groups such as: younger patients; patients with suspected “white-coat” hypertension; patients with postural symptoms.

It is also an excellent method to assess response to therapy in patients at high risk, or where there is reason to suspect either sub-optimal BP control or lack of sustained antihypertensive affect
BHS/NICE Guidance on medication choice

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**
- Beta-blockers are no longer preferred as a routine initial therapy for hypertension.
- But consider them for younger people, particularly:
  - women of childbearing potential
  - patients with evidence of increased sympathetic drive
  - patients with intolerance of or contraindications to ACE inhibitors and angiotensin-II receptor antagonists.
- If a patient taking a beta-blocker needs a second drug, add a calcium-channel blocker rather than a thiazide-type diuretic, to reduce the patient's risk of developing diabetes.
- If a patient's blood pressure is not controlled by a regimen that includes a beta-blocker (that is, it is still above 140/90 mmHg), change their treatment by following the flow chart above.
- If a patient's blood pressure is well controlled (that is, 140/90 mmHg or less) by a regimen that includes a beta-blocker, consider long-term management at their routine review. There is no absolute need to replace the beta-blocker in this case.
- When withdrawing a beta-blocker, step down the dose gradually.
- Beta-blockers should not usually be withdrawn if a patient has a compelling indication for being treated with one, such as symptomatic angina or a previous myocardial infarction.
Additional drug therapy

Patients with established cardiovascular disease or at high risk according to the Joint British Societies cardiovascular disease-risk chart computer programme or cardiovascular disease risk chart should be considered for aspirin and statin therapy as follows:

- **Aspirin**: 75 mg aspirin is recommended for hypertensive patients aged 50 years or more who have satisfactory control over their blood pressure (< 150/90) and either target organ damage, diabetes or a 10-year cardiovascular disease ≥ 20%.
- **Statin**: statin therapy is indicated when
  - 10-year cardiovascular disease risk is ≥ 20%.
  - There is established occlusive arterial disease
  - Aged 40 years or more with diabetes mellitus
  - Aged 18-39 years with diabetes mellitus and a further risk factor
  - BP ≥ 160/100mmHg
  - Total Cholesterol/HDL ratio > 6

See Forth Valley Lipid Lowering Guidelines for further details.

Referral to secondary care

**Suggested indications for specialist referral**

*Urgent treatment needed*
- Accelerated hypertension (severe hypertension with grade III-IV retinopathy)
- Particularly severe hypertension (>220/120 mmHg)
- Impending complications (e.g. ischaemic attack, left ventricular failure)

*Possible underlying cause*
- Any clue in history or examination of a secondary cause, for example, hypokalaemia with increased or high normal plasma sodium (Conn’s syndrome)
- Elevated serum creatinine
- Proteinuria or haematuria
- Sudden-onset or worsening of hypertension
- Resistance to multi-drug regimen, that is, ≥3 drugs
- Young age (any hypertension <20 years; needing treatment <30 years)

*Therapeutic problems*
- Multiple drug intolerance
- Multiple drug contraindications
- Persistent non adherence or noncompliance

*Special situations*
- Unusual blood pressure variability
- Possible white-coat hypertension
- Hypertension in pregnancy