

Hypertension

[Disclaimer](#)

COVID-19 note

Medication

Patients should continue to take ACE inhibitors and angiotensin-II receptor antagonists as part of optimal management of heart failure during the COVID-19 pandemic. For more details, see [Medicines and COVID-19](#).

Last updated: 18 May 2020

Contents

Disclaimer	1
Red Flags	2
Background – About Hypertension.....	2
Assessment	2
Practice Point	2
If hypertension confirmed.....	5
Management	6
Referral.....	10
Information.....	11
For health professionals.....	11
For patients.....	11
References.....	11
Disclaimer	12

Red Flags

- Hypertensive emergency (blood pressure > 200/140 mmHg)
- Severe hypertension (systolic > 180 mmHg) with symptoms, e.g. headache, visual disturbance, confusion, seizure, proteinuria
- Pre-eclampsia with uncontrolled severe hypertension

Background – About Hypertension

- Hypertension is common in Australia, affecting 1 in 3 adults and almost 90% of patients aged > 85.
- High blood pressure is an important contributor to cardiovascular disease.
- End-organ damage and other clinical outcomes are more closely associated with ambulatory blood pressure than in-practice or casual blood pressure measurements.
- Diagnosis of hypertension is important because treatment is typically life-long.
- Treatment decisions need to be individualised for each patient and based on an assessment of overall cardiovascular risk.
- Consider secondary causes (< 5% of all cases) especially in the younger age group, including:
 - hyperthyroidism
 - primary aldosteronism, renal disease, and renal artery stenosis
 - Cushing's syndrome
 - phaeochromocytoma
 - obstructive sleep apnoea
 - recreational drug use.

Assessment

Practice Point

Avoid over-diagnosis

In the absence of end-organ damage, do not diagnose mild hypertension before several visits and measurements.

-
1. Take history. Look for **symptoms** of high blood pressure and contributing factors, including salt and alcohol intake, obstructive sleep apnoea, obesity, and family history of hypertension in first degree relatives.

Symptoms

- *Usually asymptomatic. It is a common misconception that high blood pressure is associated with symptoms such as headache, neck pain, epistaxis, or restlessness.*
- *Severe hypertension (>180/110) can be associated with symptoms such as headaches, confusion, blurred vision, reduced level of consciousness, and seizures.*
- *Consider if antihypertensive treatment may be causing symptoms that the patient is attributing to high blood pressure.*

2. Check for **medications and substances** associated with hypertension, intolerance to any antihypertensive medication, and non-adherence.

Medications and substances

Medications:

- *NSAIDs*
- *Stimulants (dexamphetamine, modafinil)*
- *Oestrogen-containing contraceptives and HRT*
- *Corticosteroids*
- *SNRIs and monoamine oxidase inhibitors*
- *Clozapine*
- *Bupropion*
- *Decongestants*
- *Diet pills*

Substances:

- *Excessive alcohol consumption*
- *Liquorice*
- *Caffeine pills and products*
- *Energy drinks and guarana*
- *Cocaine and amphetamine*

3. If **white coat** or **masked hypertension** suspected, consider [ambulatory blood pressure monitoring](#).

White coat hypertension

- *Elevated in-practice blood pressure measurements with normal home or ambulatory blood pressures.*
- *Affects 10 to 20% of the general population.*
- *Associated with increased risk for developing true hypertension and impaired glucose tolerance.*
- *Consider in patients with wide discrepancy between in-practice and home blood pressures, a long history of hypertension without end-organ damage, and in patients with symptoms of hypotension after starting treatment.*

Masked hypertension

- *Normal in-practice blood pressure measurements with consistently elevated ambulatory blood pressure readings.*
- *Affects 10% of the general population.*
- *Consider in patients with normal in-practice blood pressures with evidence of end-organ damage.*

4. Measure blood pressure using **practice-based, ambulatory, or home measurements** (ask about home monitoring). Note that atrial fibrillation may interfere with automated devices. See American College of Cardiology/American Heart Association – [Checklist for Accurate Measurement of BP](#).

In-practice measurement

Cuff use:

- *Use an appropriate size – if in doubt use a larger cuff.*
- *Place at heart level.*

Automated measurements:

- *Use a [monitor validated for clinical use](#) (subscription required).*
- *Use an appropriate cuff size – if in doubt use a larger cuff.*

- The cuff should be at heart level.
- Before measuring, ask patient to rest alone for 5 minutes in a quiet room.
- Take three measurements. Discard the first and average the second and third readings.

Manual measurements:

- Use to confirm extremes of blood pressure or when automated readings are unsuccessful.
- Identify systolic pressure first by palpation, then confirm by auscultation.
- Diastolic pressure is defined by the disappearance of sound (Korotkoff phase V).

Ambulatory blood pressure monitoring

- Patients wear a [portable blood pressure monitor](#) for 24 hours and measurements are taken regularly during that time.
- Reporting and interpretation is not standardised although [guidelines](#) exist.
- No MBS rebate for this test and patient will have some out-of-pocket costs.

Home blood pressure monitoring

- Check patients use a [monitor validated for home use](#) and an appropriate cuff size. Most other home-based methods are not considered accurate enough e.g., finger or wrist cuffs, smart-phone apps, or non-validated monitors.
- Measurements should be taken in a structured way:
 - Morning measurements:
 - Before medications
 - After sitting for 5 minutes following taking medications
 - Evening measurements:
 - After sitting for 5 minutes following taking medications
 - Before retiring
 - Take 2 consecutive measurements, 1 minute apart.
- Record values with notes about obvious confounders, such as drinking coffee before measurement.
- Give patient Heart Foundation – [Measuring Your Blood Pressure At Home](#) information sheet.

5. **Classify** the blood pressure (BP) based on practice-based readings. The definition of hypertension is lower for **home or ambulatory** readings.

Classification

Category	Systolic		Diastolic
Optimal	< 120	and	< 80
Normal	120 to 129	and/or	80 to 84
High normal	130 to 139	and/or	85 to 89
Grade 1 hypertension	140 to 159	and/or	90 to 99
Grade 2 hypertension	160 to 179	and/or	100 to 109
Grade 3 hypertension	≥ 180	and/or	≥ 110
Isolated systolic hypertension	≥ 140	and	<

Source: Adapted from National Heart Foundation of Australia – [Classification of Clinic Blood Pressure Levels in Adults](#).

Definition of hypertension for out-of-practice readings

Category	Systolic BP (mmHg)		Diastolic BP (mmHg)
<i>In-practice BP</i>	≥ 140	<i>and/or</i>	≥ 90
<i>Ambulatory BP:</i>			
<i>Daytime (or awake)</i>	≥ 135	<i>and/or</i>	≥ 85
<i>Night-time (or asleep)</i>	≥ 120	<i>and/or</i>	≥ 70
<i>Over 24 hours</i>	≥ 130	<i>and/or</i>	≥ 80
<i>Home BP</i>	≥ 135	<i>and/or</i>	≥ 85

Source: Adapted from National Heart Foundation of Australia – [Criteria for Diagnosis of Hypertension Using Different Methods of Blood Pressure Measurement.](#)

If hypertension confirmed

1. Check for other cardiovascular **risk factors**, diabetes, and symptomatic **cardiovascular or renal disease**.

Risk factors

- *Male*
- *Increasing age*
- *Smoking*
- *Dyslipidaemia*
- *Impaired fasting glycaemia or abnormal glucose tolerance test*
- *Diabetes*
- *Obesity (BMI ≥ 30)*
- *Family history of premature cardiovascular disease in men aged < 55 years, or women aged < 65 years*

Cardiovascular or renal disease

- *Stroke or transient ischaemic attack*
- *Coronary heart disease, including angina and previous coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI)*
- *Heart failure, including heart failure with preserved ejection fraction (EF)*
- *Peripheral vascular disease*
- *Chronic kidney disease with eGFR $< 45 \text{ mL/min}/1.73\text{m}^2$*
- *Macroalbuminuria (urinary albumin creatinine ratio (ACR) $> 25 \text{ mg/mmol}$ for males and $> 35 \text{ mg/mmol}$ for females)*
- *Advanced retinopathy*

[Calculate absolute cardiovascular disease risk.](#)

2. Identify **possible organ damage** by **cardiovascular examination, kidney health check and ECG and/or echocardiography**:

Possible organ damage

- *Arrhythmias especially atrial fibrillation*
- *Left ventricular hypertrophy*
- *Carotid wall thickening or plaque*
- *Peripheral vascular disease*

- *Chronic kidney disease (CKD)*
- *Microalbuminuria*

Cardiovascular examination

- *Carotid bruits*
- *Left ventricular enlargement*
- *Renal or abdominal bruits*
- *Absent peripheral pulses in the lower limbs*
- *Retinopathy or papilloedema on fundoscopy*
- *Evidence of cardiac failure*

Kidney health check

- *Blood pressure*
- *Electrolytes, urea, and creatinine (EUC) and eGFR*
- *Urine albumin:creatinine ratio (ACR) – preferably on morning spot urine. If macroalbuminuria is detected, a 24-hour protein level is recommended.*

3. If there are [clinical indicators of secondary hypertension](#), consider limited additional investigations.

Management

1. Arrange transfer to the [Emergency Department](#) for patients who need urgent referral and management:
 - Hypertensive emergency (blood pressure > 220/140).
 - Severe hypertension with systolic blood pressure > 180 mmHg with any ***symptoms or signs:***
 - *Headache*
 - *Confusion*
 - *Blurred vision*
 - *Retinal haemorrhage*
 - *Reduced level of consciousness*
 - *Seizure(s)*
 - *Proteinuria*
 - *Papilloedema*
 - Pregnant women with pre-eclampsia with uncontrolled severe hypertension i.e.:
 - diastolic blood pressure > 110 mmHg, or
 - systolic blood pressure > 170 mmHg, or
 - systolic blood pressure > 160 mmHg on 2 occasions.

2. For all other patients, consider general principles:

- Individualise treatment decisions based on blood pressure, risk factors, asymptomatic organ damage, and established cardiovascular disease.
- Prioritise [lifestyle interventions](#) according to relevance and likely impact on blood pressure control.
- Use ACE inhibitor or ARBs, calcium channel blockers, or thiazide diuretics for first-line therapy of uncomplicated hypertension.
 - Combine drugs from different classes to achieve control.
 - With blood pressure lowering medication, start low and go slow, especially if uncertain of the duration of high blood pressure.
- Avoid using ACEI and ARB together
- Avoid the potential for the **triple whammy**:
 - *Significant kidney injury, especially if elderly, volume depleted or CKD present, can result from the use of 2 or more of the following medications:*
 - ACE inhibitor and/or angiotensin receptor blockers (ARB)
 - diuretics
 - NSAIDs
 - COX-2 inhibitors, except aspirin.
 - *Exercise extreme care when prescribing analgesics in patients on these drugs.*

3. When combining blood pressure lowering medications, follow **recommendations.**

Avoid these combinations:

- ACE Inhibitor and ARB – increased risk of hypotensive symptoms, syncope, and renal dysfunction.
- ACE Inhibitor or ARB, and potassium-sparing diuretic – risk of hyperkalaemia
- Beta blocker, and Verapamil or diltiazem – risk of heart block
- Thiazide diuretic and beta blocker – not recommended in people with glucose intolerance, metabolic syndrome, or established diabetes

Effective combinations:

- ACE Inhibitor or ARB, and CCB – for diabetes or lipid abnormalities
- ACE Inhibitor or ARB, and thiazide diuretic – for heart failure or post stroke
- ACE Inhibitor or ARB, and beta blocker – for post myocardial infarction (MI) or heart failure
- Beta blocker and dihydropyridine CCB – for symptomatic coronary heart disease

4. Treat hypertension (HT) as follows:

Other risk factors, asymptomatic organ damage, or disease	Blood pressure (mmHg)			
	High normal: • systolic blood pressure (SBP) 130 to 139, or • diastolic blood pressure (DBP) 85 to 89	Grade 1 HT: • SBP 140 to 159, or • DBP 90 to 99	Grade 2 HT: • SBP 160 to 179, or • DBP 100 to 109	Grade 3 HT: • SBP \geq 180, or • DBP \geq 110
No other risk factors e.g.: <ul style="list-style-type: none">• Male• Increasing age• Smoking• Dyslipidaemia• Impaired fasting glycaemia or abnormal glucose tolerance test• Diabetes• Obesity ($BMI \geq 30$)• Family history of premature cardiovascular disease in men aged < 55 years, or women aged < 65 years	No BP intervention	<ul style="list-style-type: none">• Lifestyle changes for several months• Then add BP drugs targeting < 140/90	<ul style="list-style-type: none">• Lifestyle changes for several weeks• Then add BP drugs targeting < 140/90	<ul style="list-style-type: none">• Lifestyle changes• Immediate BP drugs targeting < 140/90
1 to 2 risk factors	<ul style="list-style-type: none">• Lifestyle changes• No BP intervention	<ul style="list-style-type: none">• Lifestyle changes for several weeks• Then add BP drugs targeting < 140/90	<ul style="list-style-type: none">• Lifestyle changes for several weeks• Then add BP drugs targeting < 140/90	<ul style="list-style-type: none">• Lifestyle changes• Immediate BP drugs targeting < 140/90
≥ 3 risk factors	<ul style="list-style-type: none">• Lifestyle changes• No BP intervention	<ul style="list-style-type: none">• Lifestyle changes for several weeks• Then add BP drugs targeting < 140/90	<ul style="list-style-type: none">• Lifestyle changes• BP drugs targeting < 140/90	<ul style="list-style-type: none">• Lifestyle changes• Immediate BP drugs targeting < 140/90
Diabetes, CKD stage 3, or asymptomatic organ damage	<ul style="list-style-type: none">• Lifestyle changes• No BP intervention	<ul style="list-style-type: none">• Lifestyle changes• BP drugs targeting < 130/80	<ul style="list-style-type: none">• Lifestyle changes• BP drugs targeting < 130/80	<ul style="list-style-type: none">• Lifestyle changes• Immediate BP drugs targeting < 130/80
Diabetes with organ damage, CKD stage ≥ 4, or symptomatic cardiovascular disease (CVD)	<ul style="list-style-type: none">• Lifestyle changes• No BP intervention• See high absolute cardiovascular risk below	<ul style="list-style-type: none">• Lifestyle changes• BP drugs targeting < 130/80• See high absolute cardiovascular risk below	<ul style="list-style-type: none">• Lifestyle changes• BP drugs targeting < 130/80• See high absolute cardiovascular risk below	<ul style="list-style-type: none">• Lifestyle changes• Immediate BP drugs targeting < 130/80• See high absolute cardiovascular risk below

5. Consider special groups:

- **High absolute cardiovascular risk**
 - Following the SPRINT trial, the national guideline now acknowledges that a lower target of < 120 mmHg systolic blood pressure be considered to improve cardiovascular outcomes.
 - In selected high risk populations where treatment is aimed at < 120 mmHg systolic blood pressure, close follow-up is recommended to identify treatment-related adverse effects, including:
 - hypotension
 - syncope
 - electrolyte abnormalities
 - [acute kidney injury](#).
- **Hypertension in the elderly**
 - Clinical trials of hypertension in the elderly have consistently demonstrated benefit from antihypertensive therapy, including in patients aged > 80 years.
 - A systolic blood pressure target of ≤ 140 is generally recommended. However, if treatment is well tolerated in fit patients aged ≥ 75 years, consider a target of < 120 except in diabetes where the action to control cardiovascular risk in diabetes (ACCORD) trial supported a treatment target of 140/90 mmHg.
 - Close follow-up is recommended to identify treatment-related adverse effects, including:
 - hypotension
 - syncope
 - electrolyte abnormalities
 - [acute kidney injury](#)
 - In frail elderly patients, use clinical judgement and consider risks of treatment e.g., orthostatic hypotension, falls, and interactions. Polypharmacy is a particular risk. Consider use of a [home medication management review \(HMMR\)](#) or [residential medication management review \(RMMR\)](#) if concerns.
- **Isolated systolic hypertension**
 - Predominantly a problem in older patients.
 - Use first-line diuretics or calcium channel blockers.
- **Hypertension with proteinuria**
 - Hypertension is a driver for progressive renal failure in chronic kidney disease.
 - Use ACE inhibitor or ARB and titrate to the maximum tolerated dose.
 - Consider a lower systolic blood pressure target of < 130 in the following groups:
 - Urine albumin-to-creatinine ratio ≥ 30 mg/mmol
 - Albuminuria > 300 mg/24 hours
 - Proteinuria > 300 mg/24 hours

Monitor eGFR in these groups.
- **Resistant hypertension**
 - Failure to achieve target despite appropriate lifestyle measures and 3 drugs from different classes, including a diuretic, at adequate doses.
 - Exclude "pseudoresistance" due to non-adherence, white-coat hypertension, or use of small blood pressure cuffs.
 - Use a multi-modal approach:

- Check ambulatory or home blood pressures.
 - Ensure a secondary cause has not been missed, particularly underlying renal disease.
 - Review lifestyle interventions for unaddressed factors.
 - If resistant hypertension is confirmed, consider a trial of spironolactone 25 mg to 50 mg daily.
 - It is twice as effective in this setting compared with beta blockers or long-acting alpha-blockers, with approximately 8 versus 4 mmHg reductions respectively.⁹ Watch for hyperkalaemia.
 - Nephrology referral is recommended.
 - Refer for consideration of invasive treatments e.g., renal artery stenosis or phaeochromocytoma surgery, renal denervation
- 6.** Arrange regular patient monitoring 1 to 4 weekly, depending on severity of hypertension.
- 7.** Refer for [urgent or routine cardiology assessment](#) or [urgent or routine nephrology assessment](#) if patient has:
- severe persistent hypertension > 180/110.
 - refractory hypertension (blood pressure > 140/90) in patients:
 - taking ≥ 3 antihypertensive medicines.
 - unable to tolerate maximum treatment.
- 8.** Refer for [urgent or routine nephrology assessment](#) if patient has:
- suspected secondary cause for hypertension e.g., renal disease or renal artery stenosis.
 - hypertension with chronic kidney disease.
- 9.** If endocrine cause for hypertension is diagnosed, refer for [urgent or routine endocrinology assessment](#).

Referral

- Identify and arrange transfer to the [Emergency Department](#) for patients who need urgent referral and management:
 - Hypertensive emergency (blood pressure > 220/140).
 - Severe hypertension with systolic blood pressure > 180 mmHg with any [symptoms or signs](#).
 - A pregnant woman with pre-eclampsia with uncontrolled severe hypertension i.e. diastolic blood pressure > 110 mmHg or systolic blood pressure > 170 mmHg.
- Refer for [urgent or routine cardiology assessment](#) or [urgent or routine nephrology assessment](#) if patient has:
 - severe persistent hypertension > 180/110.
 - refractory hypertension (blood pressure > 140/90) in patients:
 - taking ≥ 3 antihypertensive medicines.
 - unable to tolerate maximum treatment.
- Refer for [urgent or routine nephrology assessment](#) if patient has:
 - suspected secondary cause for hypertension e.g., renal disease or renal artery stenosis.
 - hypertension with chronic kidney disease.
- If endocrine cause for hypertension is diagnosed, refer for [urgent or routine endocrinology assessment](#).

- If polypharmacy, consider referral for a [home medication management review \(HMMR\)](#) or [residential medication management review \(RMMR\)](#).

Information

For health professionals

Further information

- Heart Foundation of Australia – [Hypertension](#)
- NPS MedicineWise – [Blood Pressure](#)
- RACGP:
 - [DASH Eating Plan](#)
 - [Red Book Hypertension](#)

For patients

- Concord Hospital Renal Unit – [Home Blood Pressure Monitoring Sheet](#)
- Health Direct – [Hypertension](#)
- Heart Foundation Australia:
 - [Blood Pressure Information and Resources](#)
 - [Measuring Your Blood Pressure at Home](#)
- RACGP – [DASH Eating Plan](#)
- The George Institute – [Food Switch](#)

References

1. ABS. Australian Bureau of Statistics. [place unknown]: Australian Bureau of Statistics; [Hypertension](#). 2013.
2. HBPRCA. High Blood Pressure Research Council Of Australia. [place unknown]: High Blood Pressure Research Council Of Australia; [High Blood Pressure FAQ](#). 2016.
3. Anderson C, Arnolda L, Cowley D, Dowden J, Gabb G, Golledge J, Hankey G. [Guideline for the diagnosis and management of hypertension in adults - 2016](#). Melbourne: National Heart Foundation of Australia; 2016.
4. Frisoli TM, Schmieder RE, Grodzicki T, Messerli FH. [Beyond salt: Lifestyle modifications and blood pressure](#). European Heart Journal. 2011;32(24).
5. NPS Medicinewise. NPS MedicineWise. [place unknown]: NPS Medicinewise; [Blood Pressure: Measure, Manage, Monitor](#). 2016.
6. Mancia G, Fagard R, Narkiewicz K, Redon J, Zanchetti A, Böhm M, et al; (cpg). [2013 ESH/ESC Guidelines for the management of arterial hypertension](#). European Heart Journal. 2013 Jun;1-72.
7. Deed, G, Ackermann, E, Newman, R, Audehm, R, Arthur, I, Barlow, J, Kennedy, M, Kilov, G, Leow, S, Manski-Nankervis, J, Michaelides, C, Rasalam, R, Sharma, A. [General practice management of type 2 diabetes 2014-15](#). Melbourne: The Royal Australian College of General Practitioners and Diabetes Australia; 2014.

8. Wright JT, Williamson JD, Whelton PK, Snyder JK, Sink KM, Rocco MV, et al; SPRINT Research Group. [A Randomized Trial of Intensive versus Standard Blood-Pressure Control](#). The New England Journal of Medicine. 2015 Nov;373(22):2103-16.
9. Williams B, Macdonald TM, Morant S, Webb DJ, Sever P, McInnes G, et al. [Spironolactone versus placebo, bisoprolol, and doxazosin to determine the optimal treatment for drug-resistant hypertension \(PATHWAY-2\): A randomised, double-blind, crossover trial](#). The Lancet. 2015;386(10008):2059-2068.

Select bibliography

James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J, et al. [2014 Evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee \(JNC 8\)](#). JAMA: The Journal of the American Medical Association. 2014;311(5):507-520.

Disclaimer

Last updated: August 2020