Guideline for the diagnosis and management of hypertension in adults - 2016
Guideline Aim

• To provide health professionals with the latest evidence for controlling blood pressure
  – including methods for diagnosis, monitoring, and effective treatment strategies for patients with hypertension with and without co-morbidities
Background to guideline

• Changing evidence

• High quality studies

• Large systematic reviews and randomised controlled trials

• Updated practice considerations and recommendations
What’s new

• National Health and Medical Research Council levels of evidence
• Primary and secondary prevention focus on the contemporary management of hypertension in the context of an aging population with increasing comorbidities such as stroke and TIA, chronic kidney disease, diabetes, myocardial infarction, chronic heart failure, peripheral artery disease, and obstructive sleep apnoea
• Advice on new areas including out-of-clinic blood pressure measurement using ambulatory or home procedures, white coat hypertension and blood pressure variability
• New evidence for a target blood pressure of <120 mmHg in selected high cardiovascular risk populations, with close follow-up to identify adverse effects including hypotension, syncope, electrolyte abnormalities and acute kidney injury
Prevalence

In 2012-13

• 6 million Australians (34%) aged 18 years and over are hypertensive or taking antihypertensive medication [1]
• In the NT 23.7% of the population have HT (Tas - highest at 40.9%)
• 4.1 million Australians had uncontrolled or untreated hypertension [1]
• At least 25% of Aboriginal and Torres Strait Islander adults have untreated hypertension [2]
• Higher rates with
  – Lower household income
  – Regional areas [3]
Definition and Classification

- Blood pressure is a continuous variable related to risk
- Ranges are used arbitrarily to aid both diagnosis and management decisions

<table>
<thead>
<tr>
<th>Diagnostic category</th>
<th>Systolic (mmHg)</th>
<th>Diastolic (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal</td>
<td>&lt;120 and &lt;80</td>
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<tr>
<td>Normal</td>
<td>120-129 and/or 80-84</td>
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</tr>
<tr>
<td>High-normal</td>
<td>130-139 and/or 85-89</td>
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</tr>
<tr>
<td>Grade 1 (mild) hypertension</td>
<td>140-159 and/or 90-99</td>
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</tr>
<tr>
<td>Grade 2 (moderate) hypertension</td>
<td>160-179 and/or 100-109</td>
<td></td>
</tr>
<tr>
<td>Grade 3 (severe) hypertension</td>
<td>≥180 and/or ≥110</td>
<td></td>
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<tr>
<td>Isolated systolic hypertension</td>
<td>&gt;140 and &lt;90</td>
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</tbody>
</table>
Absolute CVD Disease Risk

- Management of hypertension should always consider absolute CVD risk [4]
- Combines multiple risk factors into a single measure of overall cardiovascular risk
- Systematic approach includes detailed medical history; cholesterol and smoking status
- Clinic reading is the only pressure measure validated to be used when using absolute CVD risk calculator
- Expressed as a percentage, likelihood of a cardiovascular event over 5 years
- Valid for Primary prevention only - Not appropriate for people with known cardiovascular disease
- Recommended for Australians > 45 years, Aboriginal and Torres Strait Islander > 35 years
- www.cvdcheck.org.au

Evaluation and Diagnosis

- Include blood pressure measurements, medical history, physical examination, assessment of absolute Cardiovascular (CVD) risk (if appropriate), laboratory investigations, and when required further diagnostic tests
- Assessed based upon multiple BP measurement; separate occasions 1-2 weeks apart; sooner depending upon severity
- Measuring devices include mercury and aneroid sphygmomanometer and electronic devices
- Clinic measures may not be sufficient to base treatment decisions on
- Ambulatory and Home Blood pressure monitoring assist in building an accurate blood pressure profile
Evaluation and Diagnosis
Clinical indications for out of clinic blood pressure measurements

- Suspicion of or identified white coat hypertension
- Suspicion of masked hypertension
- Marked variability of clinic or clinic and home blood pressure measurements
- Autonomic, postural, post-prandial and drug induced hypotension
- Identification of true resistant hypertension
- Suspicion of nocturnal hypertension or absence of nocturnal dipping, for example in patients with sleep apnoea, chronic kidney disease, or diabetes
Recommendations
Methods of measuring blood pressure

• If clinic blood pressure is $\geq 140/90$mmHg, or hypertension is suspected, ambulatory and/or home monitoring should be offered to confirm the blood pressure level.

• Procedures for ambulatory blood pressure monitoring should be adequately explained to patients. Those undertaking home measurements require appropriate training under qualified supervision.

• Finger and/or wrist blood pressure measuring devices are not recommended.

• Clinic blood pressure measures must be used in absolute cardiovascular risk calculators.
Recommendations
In aiding your decision to treat, you should:

1. Determine if the patient is eligible for absolute CVD risk assessment.

   • Eligible: Adults ≥45 years of age (>35 years of age for Aboriginal and Torres Strait Islander peoples) without a known history of CVD or other co-morbidities.

   • Ineligible: Adults <45 years of age (<35 years of age for Aboriginal and Torres Strait Islander peoples) without known CVD defined as prior myocardial infarction, prior stroke and/or TIA, peripheral arterial disease, heart failure, atrial fibrillation or aortic disease, and those with end-stage kidney disease undergoing dialysis.
Recommendations
In aiding your decision to treat, you should (cont):

2. Establish if the patient is considered high risk (>15% chance of cardiovascular event in the next 5 years).
   - Adults with any of the following do not require an absolute CVD risk assessment as they are already considered high risk:
     - diabetes and >60 years of age
     - diabetes with microalbuminuria (urinary albumin creatinine ratio 2.5–25 mg/mmol for males, 3.5–35 mg/mmol for females)
     - moderate or severe chronic kidney disease defined by macroalbuminuria (urinary albumin creatinine ratio >25 mg/mmol for males and >35 mg/mmol for females) or estimated glomerular filtration rate (GFR) <45 mL/min/1.73 m²
     - familial hypercholesterolaemia
     - systolic blood pressure ≥180 mmHg or diastolic blood pressure ≥110 mmHg
     - serum total cholesterol >7.5 mmol/L
     - Aboriginal or Torres Strait Islander adult >74 years of age

3. Calculate and manage absolute CVD risk.
   - Currently, www.cvdcheck.org.au underestimates risk in Aboriginal and Torres Strait Islander patients. In accordance with the Central Australian Rural Practitioners Association Standard Treatment Manual, it is recommended to add 5% to the calculated risk score.
   - Further information can be found within the 2012 Guidelines for the management of absolute CVD risk.13
Treatment strategy for patients with newly diagnosed hypertension

1. Check eligibility for absolute CVD risk assessment
   - Eligible
     - Conduct absolute CVD risk assessment [www.cvdcheck.org.au]
   - Not eligible
     - Define risk based on clinical assessment of target organ damage, relevant comorbidities or known vascular disease

2. High risk >15%
   - Immediate drug treatment
   - Manage associated conditions
   - Review according to clinical context
   - Review according to clinical context
   - Start drug treatment

3. Moderate risk 10–15%
   - Any of the following?
     a. BP persistently \( \geq 160/100 \) mmHg
     b. Family history of premature CVD
     c. Aboriginal or Torres Strait Islander
   - Review BP
   - SBP 140–159 mmHg or DBP 90–99 mmHg
   - Start drug treatment

4. Low risk <10%
   - Is BP persistently \( \geq 160/100 \) mmHg?
   - Review BP 140–159 mmHg after 2 months of lifestyle advice
   - BP 130–139 mmHg or DBP 85–90 mmHg
   - Review BP in 6 months
Lifestyle advice

- Recommended for all patients with or without hypertension and regardless of drug therapy
- Can be structured and tailored to individual need
- Use of motivational interviewing and the 5A’s (ask, assess, advise, assist, arrange) approach
- Advice regarding smoking cessation, nutrition, alcohol and physical activity
- Review progress regularly
- Refer to other health professionals for ongoing support and follow-up where appropriate
Recommendations
Treatment strategies & treatment targets for patients with hypertension

• Lifestyle advice
• Low absolute CVD risk (<10% 5 year risk) with persistent blood pressure ≥ 160/100mmHg antihypertensive therapy should be started
• Moderate absolute CVD risk (10-15% 5 year risk) with persistent blood pressure ≥ 140mmHg and/or ≥ 90mmHg antihypertensive therapy should be started
• Patients with uncomplicated hypertension should be treated to a target of <140/90mmHg or lower if tolerated
• In selected high absolute CVD risk populations a more intense treatment can be considered, aiming to a target of less than 120mmHg systolic blood pressure can improve cardiovascular outcomes.
• Close follow up of these patients is recommended to identify treatment related adverse effects
Recommendations
Treatment strategies & treatment targets for patients with hypertension

• In uncomplicated hypertension ACE inhibitors or ARBs, calcium channel blockers, and thiazide diuretics are all suitable first line antihypertensive drugs, either as monotherapy or combination unless contraindicated.

• The balance between efficacy and safety is less favourable for beta blockers than other first-line antihypertensive drugs. Thus beta-blockers should not be offered as a first-line drug therapy for patients with hypertension not complicated by other conditions.

• ACE inhibitors and ARBs are not recommended in combination due to the increased risk of adverse effects.
Antihypertensive therapy
Drug Treatment and Monitoring

1. Starting drug treatment
   Start with low-moderate dose of first line drug.

   Every 4-6 weeks* review for tolerance, efficacy, adverse effects and adherence.

2. If target not reached after 3 months
   Add second drug from different class at low-moderate dose.

   Every 4-6 weeks* review for tolerance, efficacy, adverse effects and adherence.

3. If target not reached after 3 months
   Increase dose of one drug to maximum before increasing dose of second drug.

   Every 4-6 weeks* review for tolerance, efficacy, adverse effects and adherence.

4. If target not reached after 3 months
   If 2 drugs at maximum dose a third drug class may be initiated at a low to moderate dose.

   Every 4-6 weeks* review for tolerance, efficacy, adverse effects and adherence.

5. If blood pressure remains elevated consider seeking specialist advice.

Manage associated conditions
Lifestyle Advice

If target reached - review 3-6 monthly for risk factors, adherence to drugs and lifestyle changes.
Treatment targets and strategies for selected co-morbidities

• Stroke and Transient Ischaemic Attack
• Acute stroke
• Chronic Kidney Disease
• Diabetes
• Myocardial Infarction
• Chronic heart failure
• Peripheral Arterial Disease
## Hypertension – Order of medication use determined by co morbidities (Strategies / Dr ILTON)

<table>
<thead>
<tr>
<th>No Co Morbidities</th>
<th>IHD</th>
<th>HF</th>
<th>AF</th>
<th>Diabetes</th>
<th>CKD –eGFR &lt; 35</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE or ARB</td>
<td>ACE + B blocker</td>
<td>ACE + B blocker</td>
<td>ACE + B blocker</td>
<td>ACE or ARB</td>
<td>Ca antagonist</td>
</tr>
<tr>
<td>Ca Antagonist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B Blocker</td>
</tr>
<tr>
<td>Thiazide</td>
<td>Ca antagonist</td>
<td>Spironolactone</td>
<td>Ca antagonist</td>
<td>B Blocker</td>
<td>ACE or ARB</td>
</tr>
<tr>
<td>B Blocker</td>
<td>nitrates</td>
<td>Thiazide or Frusemide</td>
<td>Thiazide</td>
<td>nitrates</td>
<td>nitrates</td>
</tr>
<tr>
<td>Spironolactone</td>
<td>Thiazide</td>
<td>nitrates</td>
<td>Spironolactone</td>
<td>prazosin</td>
<td>Prazosin</td>
</tr>
<tr>
<td>Physiotens/Prazosin/hydralazine/clonidine</td>
<td>Spironolactone or Prazosin</td>
<td>hydralazine</td>
<td>Prazosin</td>
<td>Thiazide or Spironolactone</td>
<td>Clonidine</td>
</tr>
</tbody>
</table>
Medication Principles — Dr ILTON

• Long acting medications preferred
  – ACE
    • Ramipril
    • Perindopril
    • Lisinopril
  – ARB
    • Irbesartan
    • Olmesartan
  – Ca Antagonists
    • Amlodipine
    • Lercardipine
    • Nifedipine oros
Medication Principles — Dr ILTON

• Combinations preferred
  – Perindopril + indapamide (Coversyl Plus)
  – Perindopril + Amlodipine (Coveram)
  – Irbesartan HCT
  – Olmesartan/Amlodipine +/- HCT (Sevikar +/- HCT)

• Consider higher efficacy medication
  – Olmesartan vs Irbesartan

• Consider Change B Blocker – with both B and alpha blocking effects
  – Change to Carvedilol
Treatment strategies for associated conditions

- White-coat or masked hypertension
- Older persons
- Pregnancy
- Blood pressure variability
- Treatment resistant hypertension
- Obstructive Sleep Apnoea
Strategies to Maximise Adherence

• Communication

• Individualise Advice

• Maintain motivation

• Combination therapies
Managing other cardiovascular risk factors

• Lipid lowering therapy

• Antiplatelet therapy
Patients’ perspectives

- Awareness of the factors influencing adherence
- Address patients understanding of the cause
- Explain the lack of symptoms
- Address any concerns about adverse effects
Resistant HT

- Defined as uncontrolled BP despite treatment with medications from all three classes (ACE/ARB, Ca Antagonists and thiazide diuretics)

- Is estimated to occur in at least 10% of treated hypertensive patients and carries excess risk for adverse cardiovascular outcomes.
Resistant HT

**Investigations**
- Review medications
- Metabolic
  - aldosterone/renin ratio (Plasma aldosterone/renin ratio – Primary aldosteronism occurs in 5–10% of patients with hypertension)
  - metanephrines – plasma/urine
- Renal Artery Imaging
  - Renal artery duplex ultrasound, renal nuclear medicine and/or CT angiography
  - For investigation of renovascular causes of hypertension (e.g. fibromuscular dysplasia in young females with hypertension, older patients who may have atherosclerotic renal artery disease and patients with a renal and/or femoral bruit).
Resistant HT cont:

- In a 2015 meta-analysis, researchers found that aldosterone antagonists were safe and effective for patients with resistant hypertension.

- Pathway 2 – Trial 2015
  - Demonstrated for the first time that spironolactone (25-50mg daily) is overwhelmingly the most effective drug treatment for resistant hypertension.
  - Spironolactone controlled BP in almost 60% of patients with resistant hypertension – and was 3-times as likely to be the a patient’s best drug versus doxazosin or bisoprolol.
  - Spironolactone was well tolerated with no significant excess adverse effects with the caveat that serum potassium levels and renal function should be monitored on treatment and treatment duration was too short to assess incident gynecomastia (~6% in longer-term studies).
• Assess and manage lifestyle risk factors in all patients.
  – Assess patient’s readiness to change lifestyle behaviours.

• Factor
  – Physical activity
  – Weight control
  – Diet
  – Smoking cessation
  – Alcohol intake

• Assess
  – Patient’s ability to safely exercise
  – Waist circumference / BMI
  – Diet (fruit and vegetables, fat and salt)
  – Amount smoked, dependence, readiness to change
  – Frequency and volume of alcohol
Recommendations and resources for lifestyle advice

• **Targets for exercise:**
  – Accumulate 150–300 minutes of moderate intensity activity or 75–150 minutes of vigorous activity each week.
  – Muscle strengthening activities on at least 2 days each week.

• **Assistance/resources**
  – Australia’s physical activity and sedentary behaviour guidelines SNAP 201450 - www.essa.org.au
  – NHMRC Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia 201351 /NHMRC Australian dietary guidelines 201352
  – Quitline (13QUIT)
  – Smoking cessation guidelines for Australian general practice 201453
  – NHMRC Guidelines to Reduce Health Risks from Drinking Alcohol 2009
Recommendations and resources for lifestyle advice

• Diet
  – Five serves of vegetables and two serves of fruit daily
  – Total fat account for 20–35% of energy intake
  – Salt to ≤6 g/day for primary prevention and 4 g/day for secondary prevention

• Cessation of smoking

• Alcohol
  – For healthy men and women, drinking no more than two standard drinks on any day and no more than four on any one occasion.
• Despite strong evidence regarding the benefits of controlling hypertension and the large number of available therapies, controlling raised blood pressure and CVD risk in individual patients and at a population level remains a large national challenge.
  – Lowering blood pressure by only 1–2 mmHg within a population is known to markedly reduce cardiovascular morbidity and mortality (Stamler et al., 1989 and Verdecchia et al., 2010).

• If clinic blood pressure is $\geq 140/90$ mmHg, or hypertension is suspected, ambulatory and/or home monitoring should be offered to confirm the blood pressure level (NHFA, 2016).
  – A standardised protocol containing resources for Australian patients and doctors on how to assess home blood pressure has been developed (Sharman et al, 2015).
• The absolute CVD risk assessment is primarily designed for primary prevention in Australian adults >45 years of age or for Aboriginal and Torres Strait Islander peoples >35 years of age with no known CVD.

  – The risk assessment algorithm and treatment options are not appropriate for people with known CVD (e.g. those with established vascular disease, including prior myocardial infarction, prior stroke and/or transient ischaemic attacks, peripheral arterial disease, end-stage kidney disease, heart failure, atrial fibrillation or aortic disease).

• Lifestyle advice is recommended for all patients with hypertension. Trials using lifestyle interventions in patients with hypertension have shown reductions in blood pressure and a reduction in combined cardiovascular events and total mortality (Eriksson et al., 2009. Folta et al., 2009, Wister et al., 2007).
Key Messages
General Practitioners and Practice Nurses

• Once decided to treat, patients with uncomplicated hypertension should be treated to a target of <140/90 mmHg or lower if tolerated (NHFA, 2016).

• In selected high cardiovascular risk populations where a more intense treatment can be considered, aiming to a target of <120 mmHg systolic blood pressure can improve cardiovascular outcomes (NHFA, 2016).

  – High cardiovascular risk populations include those with: clinical or subclinical cardiovascular disease other than stroke, chronic kidney disease, Framingham risk score for 10 year cardiovascular risk ≥15% or ≥75 years of age (The SPRINT Group, 2015).

  – In high cardiovascular risk populations, close follow-up of patients is recommended to identify treatment related adverse effects including hypotension, syncope, electrolyte abnormalities and acute kidney injury (NHFA, 2016).
Other guidelines

Targets

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>General target</td>
<td>≤140/90 lower if tolerated</td>
<td>≤140/90</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>CVD</td>
<td>≤140/90 Peripheral Vascular Disease</td>
<td>NA</td>
<td>&lt;130/80 CHD</td>
<td>≤130/80</td>
</tr>
<tr>
<td>Diabetes</td>
<td>≤140/90</td>
<td>≤130/80</td>
<td>NA</td>
<td>≤130/80</td>
</tr>
<tr>
<td>CKD</td>
<td>≤140/90 lower if tolerated</td>
<td>≤140/90</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Micro/Macro albuminuria</td>
<td></td>
<td>≤130/80</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

NA = Not applicable

### Other guidelines

#### Treatment strategies with confirmed hypertension

<table>
<thead>
<tr>
<th>Low absolute CVD risk</th>
<th>Heart Foundation Hypertension</th>
<th>Absolute CVD risk [4]</th>
</tr>
</thead>
<tbody>
<tr>
<td>If BP persistently ≥160/100, give lifestyle advice and start BP treatment</td>
<td>If BP persistently ≥160/100, give lifestyle advice and start BP treatment</td>
<td></td>
</tr>
<tr>
<td>If BP 140-159, give lifestyle advice and review in 2 months</td>
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</table>

<table>
<thead>
<tr>
<th>Moderate absolute CVD risk</th>
<th>Heart Foundation Hypertension</th>
<th>Absolute CVD risk [4]</th>
</tr>
</thead>
<tbody>
<tr>
<td>If BP persistently ≥160/100 or SBP 140-159 or DBP 90-99, give lifestyle advice and start treatment</td>
<td>If BP persistently ≥160/100, give lifestyle advice and start treatment</td>
<td></td>
</tr>
<tr>
<td>If SBP 130-139 or DBP 85-90, review in 2 months</td>
<td>If &lt;160/100, give lifestyle advice and review 3-6 months; consider BP treatment if no change</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>High absolute CVD risk</th>
<th>Heart Foundation Hypertension</th>
<th>Absolute CVD risk [4]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start BP treatment</td>
<td>Start BP treatment</td>
<td>Start BP treatment</td>
</tr>
</tbody>
</table>

### Committee membership

<table>
<thead>
<tr>
<th>Member</th>
<th>Organisation representing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor Len Arnolda (Chair)</td>
<td>National Stroke Foundation</td>
</tr>
<tr>
<td>Professor Craig Anderson</td>
<td>National Stroke Foundation</td>
</tr>
<tr>
<td>Professor Graeme Hankey</td>
<td>National Stroke Foundation</td>
</tr>
<tr>
<td>Professor Vlado Perkovic</td>
<td>Kidney Health Australia</td>
</tr>
<tr>
<td>Dr Faline Howes</td>
<td>Royal Australian College of GPs</td>
</tr>
<tr>
<td>Diane Cowley</td>
<td>Hypertension Nurses Association</td>
</tr>
<tr>
<td>Professor Markus Schlaich</td>
<td>High Blood Pressure Research Council of Australia</td>
</tr>
<tr>
<td>Mr Les Leckie</td>
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<tr>
<td>Dr John Dowden</td>
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<tr>
<td>Dr Genevieve Gabb</td>
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<tr>
<td>Professor Jonathon Golledge</td>
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<td>Professor Arduino Mangoni</td>
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<td>Professor Nicholas Zwar</td>
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Kidney Health Australia, National Stroke Foundation and the High Blood Pressure Research Council of Australia have endorsed the Guideline. The RACGP have recommended the Guideline for approval as an Accepted Clinical Resource.
The Guideline is available for download from the Heart Foundation website

www.heartfoundation.org.au/for-professionals/clinical-information/hypertension