

Hypertension in Adults:

The silent killer

Hypertension is associated with a wide-range of cardiovascular and end-organ diseases. It is a frequent finding among patients in primary care. However, the ideal management of hypertension continues to be debated. What is agreed is that hypertension is under-treated in New Zealand. Blood pressure is an important modifiable risk factor for cardiovascular and kidney disease and, when appropriate, clinicians should consider starting treatment in patients with hypertension, regardless of their overall cardiovascular risk. It is recommended that ambulatory or home measurement of blood pressure should ideally be offered to all patients suspected of having hypertension to confirm a diagnosis. Hypertension is progressive and management will usually require multiple medicines to achieve blood pressure targets and reduce overall cardiovascular risk

Hypertension is a continuum requiring regular review

Hypertension is a risk factor for many conditions including stroke, myocardial infarction, heart failure, atrial fibrillation, kidney disease and cognitive decline.¹ It is described as a silent killer because it is insidious, chronic and progressive.²

In New Zealand, the mean systolic blood pressure of many people is increasing due to the rise in obesity, sedentary lifestyles and the increasingly high fat, sugar and salt content of food.³ It is now estimated that over one-third of adult males and over one-quarter of adult females have hypertension.³ However, the condition is often under-treated with only 13.6% of New Zealand males and 16.3% of New Zealand females reporting use of an antihypertensive medicine.³ The New Zealand Guidelines Group (NZGG) Primary Care Handbook (2012) states that treatment decisions for hypertension should be based solely on an individual's five-year cardiovascular risk.⁴ United Kingdom NICE guidelines recommend treating hypertension in some patients independently, as a modifiable risk factor for cardiovascular and kidney disease (see "Balancing total cardiovascular risk against modifiable risk factors").¹

Management requires individual assessment

Cardiovascular risk assessment tools may substantially underestimate the lifetime risk in younger adults when blood pressure is the only significant risk factor.¹ This is because short-term risk assessment is powerfully influenced by age.¹ The presence of end organ damage is an important factor when making treatment decisions in patients when traditional risk scores do not indicate a high overall cardiovascular risk.

The prevalence of hypertension increases steeply with age.⁶ Routine surveillance of blood pressure in primary care therefore should be more frequent in older people.

Defining hypertension

Blood pressure has a normal distribution across the general population and the cardiovascular risk associated with increasing blood pressure is continuous. For every 2 mmHg increase in systolic blood pressure the risk of death from ischaemic heart disease and stroke rises by 7% and 10% respectively.¹ The line between normotension and hypertension is therefore arbitrary and patients should be encouraged to make lifestyle adjustments to control or reduce their blood pressure before they are diagnosed with hypertension.¹

Hypertension is diagnosed and classified in the same way in all adults, however, treatment targets are individualised on the basis of age and other co-morbidities.

Adult hypertension

An intermediate blood pressure level is described as a blood measurement of 120-139/80-89 mmHg.

Stage one (mild) hypertension is defined as a clinic blood pressure measurement of $\geq 140/90$ mmHg, or an average daytime ambulatory blood pressure measurement of $\geq 135/85$ mmHg.¹

Chronic hypertension before pregnancy is a risk factor for pre-eclampsia, therefore all women of childbearing age should have their blood pressure checked regularly and hypertension treated.⁵ Blood pressure control during the first 20 weeks of pregnancy is recommended to reduce the risk of complications such as pre-eclampsia, placental abruption and impaired fetal growth.⁵ A previous history of pre-eclampsia is also associated with a four-fold increased risk of a female later developing hypertension.⁶

Balancing total cardiovascular risk against modifiable risk factors

The advantage of basing treatment decisions on total cardiovascular risk is that the majority of people with hypertension have other cardiovascular risks, which are often additive and lead to a risk “that is greater than the sum of its parts”.⁶ In addition, hypertension in high-risk people is often resistant to treatment and requires multiple interventions, e.g. lipid modifying treatment.³ However, the disadvantage of relying solely on five-year cardiovascular risk is that treatment may be withheld from some people because their cardiovascular risk is assessed as being too low to require treatment. For example, a 35 year old Māori male who is obese, with a total cholesterol:HDL ratio of 7.8, and a blood pressure of 165/98 mmHg has an absolute cardiovascular risk of 9% (calculated with a decision support tool) and therefore management by lifestyle interventions alone is recommended until the patient reaches the age of 46 years.⁴ When considering antihypertensive treatment in younger patients with a cardiovascular risk of less than 15%, the long-term burden of disease needs to be taken into account. It is currently being debated internationally if a five year period is long enough to meaningfully convey cardiovascular risk in younger patients.

Stage two (moderate) hypertension is defined as a clinic blood pressure measurement of $\geq 160/100$ mmHg, or an average daytime ambulatory blood pressure measurement of $\geq 150/95$ mmHg.¹

Severe hypertension is defined as a systolic pressure of ≥ 180 mmHg, or a diastolic pressure of ≥ 110 mmHg.¹

Isolated systolic hypertension is defined as a clinic systolic blood pressure of ≥ 160 mmHg and diastolic < 90 mmHg.¹

Isolated diastolic hypertension is defined as a clinic diastolic blood pressure of 90 mmHg or higher and a clinic systolic pressure of less than 140 mmHg.⁷

Diagnosing hypertension

Treatment of hypertension often involves lifelong exposure to multiple medicines and their potential adverse effects. It is therefore essential that hypertension is accurately diagnosed in primary care.

Measuring blood pressure

It is common practice in consultations to record the blood pressure of a patient, with no prior history of hypertension, from a single measurement due to time constraints. However, to achieve a more accurate assessment it is recommended that at least two blood pressure measurements be taken, at least two minutes apart.¹ Ideally, measurements should be taken from both arms. If the difference between the arms is more than 20 mmHg, the measurements should be repeated.¹ If this difference persists then subsequent measurements should be taken from the arm with the highest reading.¹ Consistent differences in blood pressure measurements of greater than 10 mmHg between arms is associated with increased cardiovascular risk.⁶

Ambulatory or home testing of blood pressure should be considered whenever substantial differences persist between clinic blood pressure measurements to exclude the possibility of “white-coat” hypertension (where the patient’s blood pressure is raised due to the anxiety of having it measured in the clinic, see opposite).

If the clinic blood pressure is $\geq 140/90$ mmHg a clinical evaluation should be conducted in order to:

1. Confirm a diagnosis of hypertension
2. Assess the patient’s cardiovascular risk
3. Determine if any end organ damage has occurred
4. Detect any causes of secondary hypertension



In patients with severe hypertension (systolic blood pressure ≥ 180 mmHg or diastolic blood pressure ≥ 110 mmHg) initiation of treatment should be considered immediately, before the diagnosis of hypertension is confirmed, e.g. with ambulatory monitoring.¹

Confirming a diagnosis of hypertension

Ambulatory monitoring of blood pressure is the gold standard for confirming a diagnosis of hypertension and should ideally be offered to patients with a clinic blood pressure of $\geq 140/90$ mmHg, where availability and cost allow.¹ A number of meta-analyses have reported that ambulatory blood pressure is a more sensitive predictor of cardiovascular risk than clinic blood pressure in patients in primary care.⁶ Twenty-four hour ambulatory monitoring provides half hourly blood pressure measurements during the day and hourly measurements at night. It is an ideal method for primary care clinicians to detect white-coat or masked hypertension. Ambulatory measurement of blood pressure can also provide additional information about secondary causes of hypertension, e.g. elevated night-time blood pressure, which may suggest obstructive sleep apnoea, and increased renal and cardiovascular risk. It can therefore be a useful prognostic tool to improve the accuracy of cardiovascular risk assessments.⁸

White-coat hypertension is defined as a difference of more than 20(systolic)/10(diastolic) mmHg between clinic and daytime out-of-clinic blood pressure measurements.¹ White coat hypertension occurs in 9 – 16% of the general population, and approximately 55% of people with mild hypertension and 10% of people with severe hypertension.⁶ People with white-coat hypertension are more likely to develop hypertension in the future.⁶

Masked hypertension is the opposite of white-coat hypertension and occurs when out-of-clinic blood pressure readings are higher than measurements taken in the clinic. This is also referred to as isolated ambulatory hypertension.⁶ Masked hypertension affects 10 – 17% of the general population.⁶ Meta-analyses of studies indicate that cardiovascular events occur approximately twice as often in people with masked hypertension as people with sustained hypertension.⁶ Masked hypertension should be suspected in people with high-normal clinic blood pressure measurement, or patients with normal clinic blood pressure measurement and asymptomatic organ damage or high total cardiovascular risk.⁶

Home blood pressure measuring is an acceptable alternative to ambulatory monitoring if the patient cannot tolerate 24-hour monitoring, or if a practice does not have access to

ambulatory monitoring equipment.¹ Home measurement of blood pressure gives a more accurate assessment of the likelihood of end organ damage occurring, compared to office-based measurements alone.⁶ Home measurements should be taken (by the patient) in a quiet room while seated, with back and arm support.⁶ Two consecutive measurements should be taken in the morning and the evening for at least four days.¹ The measurements taken on the first day are disregarded, and the average measurement calculated from the remaining results.¹

Perform a cardiovascular risk assessment

A cardiovascular risk assessment should be undertaken for any patient with hypertension (also see “PHO Performance Programme”, Page 31). Risk assessment forms the basis for discussions about prognosis and treatment options with the patient and also provides information about other factors affecting cardiovascular disease management, e.g. diabetes medicines, and primary and secondary prevention of myocardial infarction and stroke. When all risk factors are taken into account, an individual's cardiovascular risk may be higher than individual risk-factors may suggest.

Investigate for end organ damage and co-morbidities

People who are diagnosed with hypertension require assessment for end-organ damage. Investigations for end-organ damage and cardiovascular risk should include:¹

- Dipstick urine test for haematuria and proteinuria
- Quantification of urinary protein with either an albumin:creatinine ratio (ACR), or protein:creatinine ratio (PCR)
- Blood sample to measure creatinine (eGFR), electrolytes, HbA_{1c}, lipids, urate
- Ophthalmoscopic examination of the fundus looking for features such as copper and silver wiring, AV nipping and retinal haemorrhages
- An ECG to assess for signs of left ventricular hypertrophy (consider referring for an echocardiogram if secondary causes for hypertension are suspected)

If symptoms are suggestive of obstructive sleep apnoea or treatment resistance is suspected to arise from obstructive sleep apnoea, then consider the need for a sleep study.

Consider secondary causes of hypertension

The vast majority of people with hypertension have essential (or primary) hypertension. This is by definition hypertension

"As tut lost summut?"

The potential pitfalls of relying solely on clinic-based blood pressure measurements when diagnosing hypertension, and the value that ambulatory blood pressure monitoring can provide, are illustrated in the following traditional story:

In 1930, Oswaldtwistle, Lancashire had only one street lamp. It was dark when George took his stroll to the Royal Oak. He sees Joe on hands and knees groping in the light of the solitary lamp. "Wot's uup lad?" George says, "As tut lost summut?" "Aye, a pound note" is the reply. "Oh, I help thee find it!" George joins Joe in the November mud. They search together. A quarter of an hour goes by, half an hour, as the hour approaches George, weary and thirsty asks plaintively: "I can't find naught! Aren't they sure thou lost it here?" "Ooh No." replies Joe, "I dropped it up street but there is no light up there!"

This has also been referred to as parking-lot science – looking for something not where it is most likely to be, but under the streetlight, where it is most convenient. What can be seen is not always the most important thing to look at.



without an identifiable cause. Essential hypertension is thought to result from genetic predisposition and various environmental influences that are not completely understood. Risk factors that have been identified include increased weight, ageing, lack of regular exercise and dietary factors such as high salt intake (including soy sauce) and excessive liquorice consumption.⁶

Patients who are aged under 40 years with stage one (mild) hypertension and no evidence of target organ damage, cardiovascular disease, kidney disease or diabetes may benefit from further examination of possible secondary causes of hypertension and a more detailed assessment of potential end organ damage.¹ This is because short-term risk assessment (five-year predictive risk) can underestimate the lifetime risk of cardiovascular events in these people.¹

Secondary causes of hypertension include:^{4,6,9}

- High alcohol intake
- Obstructive sleep apnoea
- Medicines, e.g. oral contraceptives and corticosteroids, non-steroidal anti-inflammatory medicines (NSAIDs), ciclosporin and decongestants, e.g. phenylephrine
- Drug misuse, e.g. amphetamine or cocaine use
- Renal parenchymal disease, including glomerulonephritis, suggested by a history of urinary tract infection or obstruction, haematuria, analgesic misuse, or family history of polycystic kidney disease
- Renal artery stenosis
- Primary hyperaldosteronism (Conn's syndrome) suggested by significantly raised blood pressure in otherwise well people, hypokalaemia and a family history of the syndrome in some people
- Cushing's syndrome – excessive cortisol production
- Pheochromocytoma – a rare adrenal gland tumour

Management of hypertension

Hypertension is a condition that requires lifelong treatment with regular review and usually intensification of management. There are only a limited number of people with hypertension that can be effectively managed with monotherapy.⁶

Individual blood pressure targets

Blood pressure targets should be individualised according to a patient's age and the presence of co-morbidities. A target blood pressure of < 140/90 mmHg is appropriate for most


people aged under 80 years.¹ Patients with chronic kidney disease (CKD), diabetes or cardiovascular disease should aim for a target blood pressure of < 130/80 mmHg.^{4, 10} Lower blood pressure targets should be approached with caution as a systolic blood pressure of < 120 mmHg is associated with a greater frequency of serious adverse effects in people with type 2 diabetes.⁴ In people aged over 80 years a target of < 150/90 mmHg is recommended.^{1, 11}

If out-of-clinic monitoring of blood pressure is used, a target of < 135/85 mmHg for uncomplicated hypertension in people under age 80 years, or < 145/85 mmHg for people over age 80 years is recommended.¹

Life-style modification is always important

The patient's diet, weight, level of exercise, alcohol consumption and smoking status should be recorded and the patient urged to make positive life changes. Blood pressure control and treatment adherence should be followed-up regularly at future consultations.

Excessive salt intake plays a significant role in hypertension as well as contributing to resistant hypertension.⁶ Daily salt intake for most people ranges from 9 – 12 g per day.⁶ People with hypertension who are able to reduce their salt intake to approximately 5 g per day can achieve a reduction in systolic blood pressure of 4 – 5 mmHg.⁶ The benefits of salt reduction are greatest for people at increased cardiovascular risk, e.g. older people and people with diabetes or CKD.⁶ Decreasing the amount of processed food in the diet is the best way to achieve this as approximately 80% of dietary salt is "hidden" in processed food.⁶

 The New Zealand Heart Foundation has resources available to promote healthy lifestyles, e.g. "A guide to heart healthy eating" and "The Pacific heartbeat programme". The Heart Foundation's "Know your numbers" tool allows patients to calculate their 5-year cardiovascular risk by answering a simple questionnaire.

When to initiate antihypertensive medicines

Antihypertensive treatment is indicated for the following patients:^{1, 4}

1. Patients with blood pressure $\geq 160/100$ mmHg, i.e. Stage 2 (moderate) or severe hypertension
2. Any patients with hypertension who have **any** of the following factors:
 - Evidence of target organ damage
 - Cardiovascular disease

- Renal disease
- Diabetes
- Five-year cardiovascular risk $\geq 15\%$

Patients aged under 40 years with a cardiovascular risk < 15% with stage one hypertension (140 – 160/90 – 100 mmHg), who do not have any other criteria for the treatment of hypertension, may still require management of blood pressure.¹ Consider referring these patients for more extensive evaluation for end organ damage, e.g. echocardiogram, and specialist assessment for secondary causes of hypertension.¹

Patients with isolated systolic hypertension, e.g. > 160 mmHg, should be offered the same treatment as people with elevated systolic and diastolic blood pressure.¹

Patients with isolated diastolic hypertension without significant co-morbidities should be treated according to their overall cardiovascular risk. The importance of isolated diastolic hypertension is considered to be less than isolated systolic hypertension.⁷

Patients with an intermediate blood pressure level, i.e. between 120 – 139/80 – 89 mmHg, should be encouraged to implement lifestyle measures to control or reduce their blood pressure and prevent being diagnosed with hypertension.

Intensification of treatment

The main benefits of antihypertensive treatment are due to the blood pressure lowering properties of medicines.⁶ Furthermore, most people who are being treated for hypertension will require multiple medicines and increased doses to achieve treatment targets. Therefore the decision of when to initiate treatment is more important than which medicine is chosen. Choice of medicine is also influenced by the presence of co-morbidities and other clinical findings (see Table 1).

Adding combination treatment early often results in a greater number of patients responding more quickly to treatment compared to those on monotherapy.⁶ There are also synergies in pharmacology when antihypertensive medicines are combined, which may assist in reducing blood pressure further and result in less adverse effects.⁶ In patients who are at high-risk of a cardiovascular event, especially those with significant proteinuria, combination treatment is likely to be required with the use of three to four different medicines. Patients at high risk should be reviewed on a two-weekly basis to adjust doses and introduce other medicines to reduce blood pressure to target and potentially reverse proteinuria.

Table 1: Treatment guidance for primary prevention in patients with hypertension^{1,6}

Step one treatment for primary prevention in patients with uncomplicated hypertension is an ACE inhibitor or calcium channel blocker:

Step two treatment, combine an ACE inhibitor or ARB with a calcium channel blocker.

Step three treatment, add a thiazide diuretic e.g. indapamide.

N.B. Females of reproductive age should generally not be prescribed an ACE or ARB. Beta-blockers, e.g. metoprolol, or calcium channel blockers, e.g. felodipine, are recommended.

If the patient has diabetes or there is evidence of end organ damage, e.g. left ventricular hypertrophy, proteinuria, an ACE inhibitor should be prescribed first-line.

Consider a beta-blocker in combination early when:

- **Ischaemic heart disease or heart failure** is present – to reduce mortality
- **Atrial fibrillation** is present – for rate control

If peripheral vascular disease is present an ACE inhibitor should be considered to slow disease progression, or a calcium channel blocker to vasodilate the peripheral arteries

Step one treatment

In younger patients (NICE guidelines suggest those aged under 55 years) with hypertension, an ACE inhibitor or, if not tolerated, an angiotensin II receptor blocker (ARB) is the first treatment step.¹ ACE inhibitors or ARBs are generally effective and very well tolerated and should be the first choice for most patients with hypertension. ACE inhibitors and ARBs should not be prescribed concurrently without the recommendation of a Diabetologist or Nephrologist.⁴ Females of child bearing age should also not be treated with ACE inhibitors or ARBs due to the risk of foetal abnormalities.⁶ Table 2 provides guidance on doses for antihypertensive medicines.

In older patients (NICE guidelines suggest those aged over 55 years) with hypertension, initial treatment with a calcium channel blocker may provide greater benefit than an ACE inhibitor.¹ However, ACE inhibitors have also been shown to provide substantial benefits to older patients with hypertension in certain clinical situations (Table 1).¹¹

Step two treatment

Step two treatment involves either the addition of a calcium channel blocker for younger patients, or an ACE inhibitor or ARB for older patients (Table 1).¹

This guidance reflects the fact that most people with

hypertension will require multiple medicines and that the combination of a calcium channel blocker with an ACE inhibitor is considered to be the most beneficial. The ACCOMPLISH (Avoiding Cardiovascular Events in Combination Therapy in Patients Living with Systolic Hypertension) trial found a significant benefit in the combination treatment of a calcium channel blocker (amlodipine) plus an ACE inhibitor (benazepril), compared to the combination of benazepril plus a thiazide diuretic (hydrochlorothiazide).¹

Step three treatment

Add a thiazide diuretic; indapamide and chlortalidone (chlorthalidone) have the strongest evidence of effectiveness in the treatment of hypertension and are preferred to conventional thiazides, such as bendroflumethiazide (bendrofluazide) or hydrochlorothiazide.¹ However, patients who are already being successfully treated with bendroflumethiazide do not need to be switched unless more intensive treatment is required.¹ The addition of a thiazide diuretic may help to reduce peripheral oedema associated with the use of calcium channel blockers. Patients taking diuretics should have their serum electrolytes monitored as hypokalaemia and hyponatraemia are known adverse effects.¹² Thiazide diuretics should also be prescribed with caution in younger patients as they can potentially increase the incidence of new-onset diabetes, particularly in high doses or when combined with a beta-blocker.¹³

Table 2: Recommended doses for commonly used antihypertensive medicines in New Zealand¹²

Class	Fully-subsidised option	Usual adult dose range
ACE inhibitors	■ Cilazapril	500 micrograms – 1 mg, once daily, adjusted according to response. Maximum 5 mg daily.
	■ Quinapril	10 mg, once daily. Maintenance dose, 20 – 40 mg, daily in divided doses.
	■ Enalapril	5 mg, once daily. Maintenance dose 20 mg, once daily, maximum 40 mg daily.
	■ Lisinopril	4 mg, once daily in the morning for one month. Adjusted according to response to a maximum of 8 mg, daily.
Angiotensin-II receptor blockers (ARBs)	■ Candesartan	8 mg, once daily, initially and as maintenance dose. Can be increased at two - four week intervals if necessary to a maximum of 32 mg, daily.
	■ Losartan	50 mg, once daily. Less if aged > 75 years. Can be increased to 100 mg, once daily, after several weeks.
Calcium channel blockers	■ Felodipine	5 mg, once daily in the morning (2.5 mg in older patients). Maintenance dose, 5 – 10 mg, once daily.
	■ Amlodipine	5 mg, once daily. Maximum dose 10 mg, once daily.
	■ Diltiazem	120 – 180 mg, modified release, once daily, increased if necessary every two weeks to a maximum of 240 - 360 mg, daily.
Diuretics	■ Chlortalidone	12.5 – 25 mg, once daily in the morning. Electrolytes and kidney function should be assessed before increasing the dose to 25 mg.
	■ Indapamide	2.5 mg, once daily in the morning
	■ Bendroflumethiazide	2.5 mg, once daily in the morning
Beta-blockers	■ Metoprolol succinate	47.5 mg, once daily. Increased if necessary. Maximum, 190 mg daily (slow release formulation).
	■ Atenolol	25 – 50 mg, once daily
	■ Celiprolol	200 mg, once daily in the morning. Maximum 400 mg daily.
	■ Bisoprolol	5 mg, once daily in the morning, increasing to a maximum of 20 mg daily.
ACE inhibitors with diuretics	■ Cilazapril + hydrochlorothiazide	5/12.5 mg, once daily
	■ Quinapril	10/12.5 mg, once daily. If necessary increased to 20/25 mg, once daily.

N.B. The doses in this table are from the New Zealand Formulary; some clinicians may recommend alternative dosing strategies, e.g. initiating treatment at lower doses before increasing to achieve target blood pressure.

Beta-blockers are no longer recommended as an initial treatment

Beta-blockers do not reduce the risk of stroke as much as other antihypertensive medicines and are generally poorly tolerated.¹⁴ However, for people with ischaemic heart disease or heart failure they may be a good treatment choice (Table 1, previous page). Beta-blockers may also be appropriate for some younger people who; are intolerant to ACE inhibitors or ARBs, females who may become pregnant, or where there is evidence of sympathetic drive causing hypertension, e.g. stress.¹ If a beta-blocker is started, then a calcium channel blocker, or an ACE inhibitor/ARB is the preferred second-line treatment.¹

If peripheral vascular disease is present an ACE inhibitor should be considered to slow disease progression, or a calcium channel blocker to vasodilate the peripheral arteries.

Resistant hypertension

If a patient's clinic blood pressure remains over 140/90 mmHg after a treatment regimen of an ACE inhibitor or an ARB, plus a calcium channel blocker and a diuretic, then the hypertension is considered to be resistant.¹ Patient adherence to treatment should be re-examined and an added emphasis placed on; weight loss, exercise, reduced salt intake, moderation of alcohol intake, stress reduction and minimisation of other medicines that may increase hypertension, e.g. non-steroidal anti-inflammatory drugs (NSAIDs) and oral contraceptives.¹⁵ Secondary causes of hypertension should also be assessed and consultation with a Nephrologist or Cardiologist

considered. Ambulatory monitoring of blood pressure should be conducted, where possible, to exclude a white-coat cause for the hypertension and to accurately assess the effects of future and current treatment.⁶

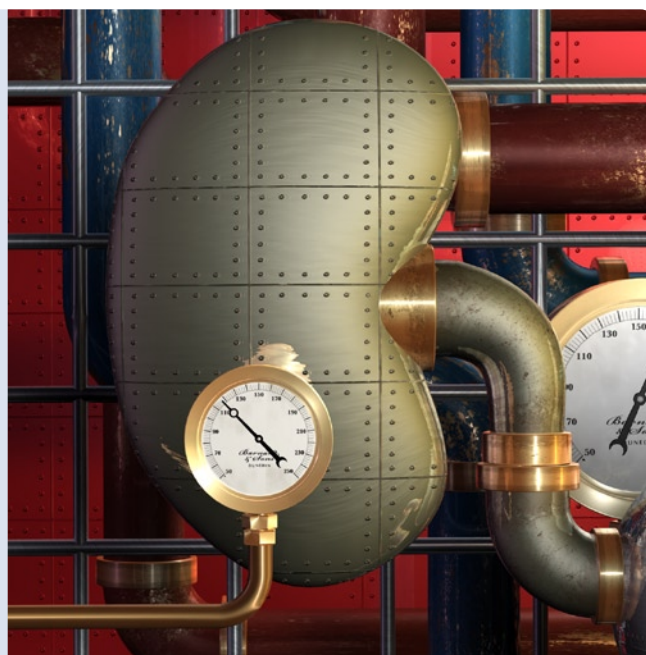
Additional investigations in secondary care may include a renal ultrasound scan, with renal artery Doppler study to investigate stenosis and echocardiogram for ventricular hypertrophy and dilation of the ascending aorta. Measurement of blood renin, aldosterone, cortisol and metanephrine levels may be appropriate, but these tests should be discussed first with an Endocrinologist.⁶

Additional medicines

Further diuretic treatment with spironolactone (25 mg, once daily, in the morning – some clinicians start with 12.5 mg) may be appropriate, if serum potassium is ≤ 4.4 mmol/L.¹ If the patient's renal function is impaired there is an increased risk of hyperkalaemia and hyponatremia. Serum sodium and potassium should be monitored after one week, then every three months for the first year.¹² If the patient's serum potassium is > 4.5 mmol/L consider an increased dose of a thiazide diuretic in preference to spironolactone.¹ An alpha- or beta-blocker may be considered if hypertension continues to be resistant, particularly in males.¹ If the patient is taking optimal, or maximum tolerated, doses of antihypertensive medicines, an appropriate specialist opinion, e.g. Cardiologist if they have cardiovascular disease or Nephrologist if they have declining renal function, is recommended, if this has not been sought already.¹

New techniques for treating hypertension

Renal sympathetic nerve denervation is a catheter-based technique showing promise in reducing blood pressure in patients with resistant hypertension. After two years, in patients with systolic blood pressures > 160 mmHg, there was an average blood pressure reduction of 32/14 mmHg.¹⁶ Blood glucose levels were also shown to improve.¹⁶ The procedure does not appear to be associated with significant adverse effects. Patients who may benefit from this technique should be discussed with a Cardiologist.




Follow-up and monitoring of people with hypertension

It is important that once hypertension is confirmed, and treatment has begun, that management is intensified over the following three months. Follow-up is also important to ensure target levels are maintained and to reinforce the importance of adherence to the treatment regimen to the patient. Depending on the level of risk and control achieved, medicines should be reviewed on a three to six-monthly basis with surveillance for end organ disease and associated conditions. This provides an opportune time to reinforce lifestyle management and to monitor electrolytes and renal function. Home blood pressure measurements are a useful monitoring adjunct.

Follow-up ambulatory monitoring of blood pressure is helpful when it is difficult to confirm whether target blood pressures are being met, or when additional antihypertensive medicines beyond ACE inhibitors/ARBs, calcium channel blockers or thiazide diuretics are required.

Patients should be advised about the possible adverse effects of their medicines and asked to contact their General Practitioner or Pharmacist if they have any concerns that may affect their adherence to treatment. Dosing regimens should be as simple as possible to maximise adherence and minimise the risk of error.

 The New Zealand Formulary provides information on medicine adverse effects and interactions, available from: www.nzf.org.nz

Should antihypertensive treatment ever be stopped in older patients?

The average life expectancy for a person aged over 80 years in New Zealand is between eight and ten years and treatment for hypertension can substantially reduce the risk of death in these patients.^{17, 18} The Hypertension in the Very Elderly trial (HYVET) treated patients aged over 80 years with hypertension averaging 173/91 mmHg for an average of 1.8 years with indapamide and perindopril to a blood pressure target less

PHO Performance Programme – cardiovascular disease risk assessment

Cardiovascular risk assessment is currently a PHO Performance Programme indicator and should be undertaken at least every five years in the following patient groups in order to count towards the target:¹⁹


- Males of Māori, Pacific, or Indian sub-continent ethnicity aged 35 – 74 years
- Females of Māori, Pacific, or Indian sub-continent ethnicity aged 45 – 74 years
- Males of any other ethnicity aged 45 – 74 years
- Females of any other ethnicity aged 55 – 74 years

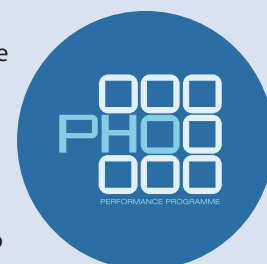
This indicator accounts for 20% of funding; 8% for the total population and 12% for the high needs population.¹⁹ The high needs population for the purposes of the Programme are enrolled people of either Māori or Pacific descent, or people who live in the most deprived socioeconomic areas – NZDep decile 9 or 10.¹⁹

The programme goal is for 90% of individuals within the target population to have had a CVD risk assessment recorded by 1 July 2014.¹⁹ The target is assessed by

counting the number of enrolled people in a PHO within the eligible population who have had a CVD risk recorded since July 2008 (the numerator). This number is then divided by the number of people in the PHO who are eligible for a CVD risk assessment (the denominator).¹⁹ As of 31 December 2012, the nationally reported coverage of cardiovascular risk assessment was 57.8% for the high needs population and 55.8% for the total eligible population.²⁰ This performance has been steadily trending upwards and 85% of PHOs improved performance for this indicator for the high need population, and 94% improved performance for the total population.²⁰ However, PHOs will need to make more rapid progress if the performance goal is to be reached before July 2014.

Ensuring that all CVD risk assessments that are taken are recorded in the patient record is one simple way to make progress towards the target.

 Further information regarding the PHO Performance Programme is available from: www.dhbsharedservices.health.nz/Site/SIG/pho/Default.aspx




than 150/80 mmHg.¹¹ Stroke rates were reduced by 30%, heart failure mortality by 64% and all-cause mortality by 21%.¹¹

There is no reason to withhold antihypertensive treatment from older patients on the basis of age alone and routine treatment of hypertension should generally be offered to the patient for as long as they wish to take it.

Monitoring blood pressure in older patients

Orthostatic hypotension is more common in older patients.¹⁸ Blood pressure should be recorded lying and standing, and treatment targets adjusted to reduce the risk of blood pressure-related falls. All antihypertensive medicines can compound this problem.¹⁸ It may be necessary to conduct

regular medicine reviews with older patients and a blood pressure < 130/70 mmHg should be avoided in patients aged over 80 years.¹⁸

 For further information see: "Managing medicines in older people", BPJ 47 (Oct, 2012)..

ACKNOWLEDGEMENT: In developing this article we consulted two Cardiologists, two Nephrologists and an Epidemiologist for their views, and thank them for their input.

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