

# Why bother treating hypertension in the elderly?

GPs often see elderly patients who are hypertensive. Why do the elderly become hypertensive, are there benefits in treating these patients and which treatment does the recent evidence suggest you should use? This article discusses these points.

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Hypertension in the elderly is a common problem, with 60% of people over 60 years of age being hypertensive (i.e. blood pressure  $\geq 140/90$  mmHg). Hypertension is abnormal at any age and not an inevitable part of ageing. Recent evidence has confirmed there are many benefits in treating hypertension in those over 60 years of age.

## What is high blood pressure in the elderly?

Most people are aware of the grades of hypertension in the general population, but does this classification apply to the elderly? The US *Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (JNC 7) recommends the use of the same definitions in the elderly as in the young; these are listed in Table 1.<sup>1</sup>

## Why is hypertension so common in the elderly?

Hypertension in the elderly is usually a multifactorial disorder involving:

- reduction in arterial compliance – due to

intimal thickening, fibrosis and calcification – and thus an increase in peripheral resistance

- reduction in renal function – beyond 30 years of age, glomerular filtration rate falls by 1 mL/min/year; importantly, this reduces the capacity to eliminate efficiently a salt load
- failure of a normal age-related decline in plasma renin activity
- higher plasma catecholamine levels due to reduced tissue responsiveness with ageing
- reduction in baroreceptor sensitivity causing higher blood pressure variability.

## What types of hypertension are common in the elderly?

Essential hypertension is the most common cause of hypertension in the elderly. There are two common subtypes in the elderly:

- combined systolic and diastolic hypertension
- isolated systolic hypertension, accounting for 65 to 75% of cases of hypertension in the elderly.

It must be recognised, however, that secondary causes (especially atherosclerotic renovascular hypertension) may also be involved.

## IN SUMMARY

- There is good evidence that treating hypertension in the elderly will reduce significantly morbidity and mortality.
- Most elderly patients will have essential hypertension, but other causes must be considered and basic investigations performed.
- Isolated systolic hypertension is the most common type of hypertension in the elderly and is best treated with diuretics, ACE inhibitors or calcium antagonists.
- Patients' comorbidities must be considered when antihypertensive medications are chosen.
- The minimum aim of antihypertensive treatment in the elderly should be to reduce blood pressure to 160/90 mmHg, but the lower the better.



### What is the evidence that treatment is beneficial?

Evidence that the treatment of hypertension in the elderly is beneficial has been available since 1980. This evidence is likely to underestimate the benefit since about one-third of the patients involved in the various trials failed to reach the target blood pressure but nonetheless were included in the final analyses. The results of these studies are summarised in Table 2.<sup>2-6</sup> They all concur that there is reduced morbidity and mortality in treating hypertension in the elderly population (Figure 1). Indeed, the benefits in the elderly are far greater than those seen in the treatment of younger patients with essential hypertension who have a lower cardiovascular risk.

Another way to show the benefit of treating hypertension is to look at the absolute benefit. The studies show that the approximate number of hypertensive elderly patients who have to be treated for five years is:

- nine to 18 to prevent a major cardiovascular event in one patient
- 43 to prevent one cerebrovascular event
- 61 to prevent one coronary event.

### Isolated systolic hypertension

A meta-analysis of eight large trials evaluating isolated systolic hypertension in the elderly found that

**Table 1. JNC 7 classification of blood pressure for adults**

Category	Systolic (mmHg)		Diastolic (mmHg)
Normal	<120	and	<80
Prehypertension	120–139	or	80–89
Hypertension			
Stage 1	140–159	or	90–99
Stage 2	≥160	or	≥100

JNC 7 = The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.<sup>1</sup>

therapy resulted in a reduction in:

- total mortality by 13%
- cardiovascular mortality by 18%
- stroke by 30%.<sup>7</sup>

The Syst-Eur trial also analysed the effect of hypertension on dementia. It found that a reduction in blood pressure of 8/4 mmHg resulted in a 50% reduction in the incidence of dementia. One thousand patients with hypertension would have to be treated for five years to possibly prevent 19 cases of dementia.<sup>8</sup>

A similar analysis was performed by the SHEP investigators. In this trial there was no association between the treatment of hypertension and dementia.<sup>9</sup> The different results may be explained by the different antihypertensive medications used. The Syst-Eur trial used nitrendipine as first line medication while the SHEP trial used chlorthalidone.

The question of whether there is an association between hypertension and dementia will hopefully be answered soon by the pending DEPHY (DEmentia Prevention in HYpertension) trial.

### Treatment in the very elderly

Most of the trials looking at hypertension treatment in the elderly have included few very elderly patients (i.e. those over 80 years of age). We await the results of HYVET (HYpertension in the Very Elderly Trial), which is looking specifically at this population.

Meanwhile, a meta-analysis of very elderly patients treated with medications for hypertension found that the treatment of hypertension in this population resulted in a 34% reduction in strokes, 22% reduction in cardiovascular events and 39% reduction in heart failure.<sup>10</sup> There was no treatment benefit for cardiovascular death.

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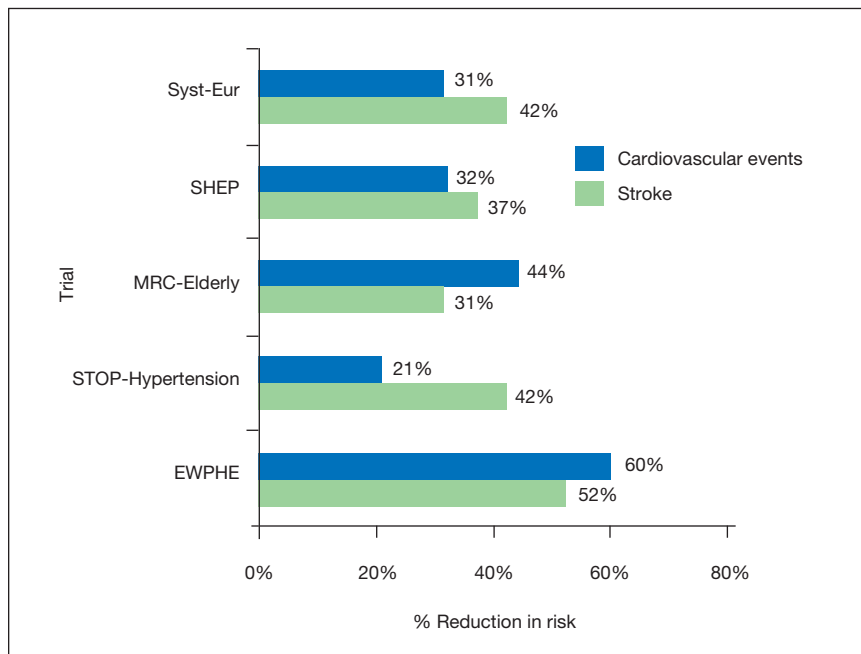


Figure 1. Benefits of treating hypertension in the elderly according to the findings of recent trials. Abbreviations. Syst-Eur = Systolic Hypertension in Europe Trial; SHEP = Systolic Hypertension in the Elderly Program; MRC-Elderly = Medical Research Council trial of treatment of hypertension in older adults; STOP-Hypertension = Swedish Trial in Old Patients with Hypertension; EWPHE = European Working Party on High Blood Pressure in the Elderly trial.

### How is blood pressure measured in the elderly?

The technique for measuring blood pressure in the elderly is essentially the same as that for younger patients. However, the list of tips below may be helpful in improving the accuracy and diagnostic value of the measurement. Taking the blood pressure carefully can be time consuming but will prevent incorrect prescribing of medications or referral.

- Blood pressure should be measured 30 to 60 minutes before anti-hypertensive medication is taken.
- Extraneous variables such as eating, exercise, smoking or caffeine ingestion have varying effects on blood pressure and should be avoided for at least one hour before the blood pressure is measured.
- Use of the appropriate cuff size is very important. The length of the bladder should be at least 75% of the circumference of the upper arm. The width of the bladder should be greater than 50% of the upper arm length. If an

**Table 2. Summary of findings of various hypertension treatment trials in the elderly**

	EWPHE <sup>2</sup>	STOP-Hypertension <sup>3</sup>	MRC-Elderly <sup>4</sup>	SHEP (ISH) <sup>5</sup>	Syst-Eur (ISH) <sup>6</sup>
Number of patients	840	1627	4396	4763	4695
Mean age	72 years	76 years	70 years	72 years	70 years
First line drug	Hydrochlorothiazide, triamterene	Hydrochlorothiazide	Hydrochlorothiazide, amiloride, atenolol	Chlorthalidone	Nitrendipine
Add on drug	Methyldopa	Amiloride, atenolol, metoprolol, pindolol	Beta blocker, calcium antagonist	Atenolol, reserpine	Enalapril, hydrochlorothiazide
Mean BP at trial entry	182/101 mmHg	195/102 mmHg	180/83 mmHg	170/77 mmHg	174/86 mmHg
Mean change in BP with treatment	19/5 mmHg	20/8 mmHg	12/6 mmHg	12/4 mmHg	23/7 mmHg
Comments regarding treatment outcome	Showed a 27% reduction in cardiovascular mortality	Showed a 43% reduction in total mortality		Showed a 54% reduction in congestive heart failure	Showed a 50% reduction in the incidence of dementia

Abbreviations. EWPHE = European Working Party on High Blood Pressure in the Elderly trial; STOP-Hypertension = Swedish Trial in Old Patients with Hypertension; MRC-Elderly = Medical Research Council trial of treatment of hypertension in older adults; SHEP = Systolic Hypertension in the Elderly Program; Syst-Eur = Systolic Hypertension in Europe Trial; BP = blood pressure; ISH = isolated systolic hypertension.

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inappropriately small cuff is used, this will lead to an overestimation of the systolic pressure.

- Patients should be seated for five minutes before measurement and

their arm should be at the level of the heart. Allowing patients to hang their arm by their side can result in an artificially high blood pressure (by as much as 12 mmHg).

- The systolic blood pressure should be determined initially by palpation and then auscultated to avoid underestimating the blood pressure.
- Lying and standing blood pressure measurements should be taken.
- Initially the blood pressure should be checked in both arms.

**Table 3. Investigations in elderly patients with hypertension**

**Basic investigations**

- Urinalysis
- Full blood count
- Blood chemistry (e.g. potassium, sodium, creatinine and fasting glucose)
- Lipid profile (e.g. total LDL and HDL cholesterol)
- 12-lead electrocardiography
- Chest x-ray

**Discretionary investigations**

- Creatinine clearance
- Urine albumin measurement (to detect microalbuminuria)
- 24-hour urinary protein measurement
- Serum calcium measurement
- Serum uric acid measurement
- Glycosylated haemoglobin measurement
- Thyroid stimulating hormone measurement
- Cardiac echocardiography
- Renal ultrasonography
- 24-hour ambulatory blood pressure monitoring

**How should elderly patients be assessed?**

A careful history should be taken and physical examination performed, with particular interest being paid to any evidence of end organ damage (including retinopathy), vascular disease or secondary causes of hypertension. In particular, patients should be asked about their use of over-the-counter medications, such as NSAIDs and nasal decongestants, which are prohypertensive. A diet history should also be elicited as patients may be ingesting large amounts of licorice or sodium-rich foods (such as Vegemite, Bonox or instant soups).

Investigations are undertaken to look for end organ damage and uncover any secondary causes of hypertension. Table 3 lists the basic and discretionary investigations; the need for the latter would depend on the patient’s clinical features.

**When do I start treating and what is the target blood pressure?**

The decision to treat hypertension in the elderly should always be based on several blood pressure measurements taken at different times, unless the blood pressure is dangerously elevated. It also depends on the patient – that is, the risks of untreated hypertension in a particular patient versus the potential side effects of the treatment.

Ideally, the aim should be to lower blood pressure to less than 140/90 mmHg. In patients over 65 years of age, lowering systolic blood pressure to a level below 160 mmHg reduces morbidity and mortality. There is little evidence in the elderly for aggressively treating patients with blood pressures below 160/90 mmHg. This will no doubt change, as there is strong evidence in non-elderly adults that the lower the blood pressure (targets as low as 120/80 mmHg), the better the outcomes.

**What are the treatment options?**

Treatment should always begin with lifestyle modifications. Such modifications should be an integral part of management even if medications are used.

**Nonpharmacological options**

For many years nonpharmacological treatment options have been somewhat ignored. There is now good evidence in the elderly that with relatively simple

**Table 4. Benefits of lifestyle modifications according to JNC 7<sup>1</sup>**

Lifestyle modification	Recommendation	Approximate SBP reduction
Weight reduction	Maintain normal body mass index	5–20 mmHg/10 kg weight lost
Salt restriction	Limit intake to 100 mmol/day	2–8 mmHg
Moderate alcohol consumption	Limit consumption to no more than 2 drinks/day for men and 1 drink/day for women	2–4 mmHg
Physical activity	Undertake regular aerobic activity (at least 30 minutes/day on most days of the week)	4–9 mmHg

Abbreviations. JNC 7 = The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure; SBP = systolic blood pressure.

measures medications may not be needed or their need reduced (and hence side effects avoided or minimised).

TONE (the Trial Of Nonpharmacologic interventions in the Elderly) was a randomised control trial that showed that weight loss and salt restriction were beneficial to the elderly.<sup>11</sup> It included 975 patients between 60 and 80 years of age who were randomised to a reduction in salt intake (80 mmol/day), weight loss (average loss 3.5 kg), both or neither. There was a reduction in blood pressure in all of the intervention groups. The salt reduction group reduced their systolic and diastolic blood pressure by an average 3.4 mmHg ( $\pm 0.8$ ) and 1.9 mmHg ( $\pm 0.5$ ), the weight loss group by 4 mmHg and 1.1 mmHg, and the combined group by 5.3 mmHg and 3.4 mmHg, respectively. Most impressively, there was a significant reduction in the need for antihypertensive therapy. There were no significant differences in cardiovascular endpoints after an average of 30 months' follow up.

The main areas of nonpharmacological intervention include:

- weight loss
- salt restriction
- alcohol intake
- smoking cessation
- physical activity.

The benefits of modifying these areas are illustrated in Table 4.

### Pharmacotherapy

#### Cautionary notes

The points below should be considered when treating elderly patients with hypertension.

- The aim of treatment is to reduce blood pressure gradually so that hypotension is minimised, and if it does occur it is mild.
- Lower initial doses of medication should be used to minimise side effects because the elderly have altered pharmacokinetics; initial starting dosages should be half that used in younger patients.
- All studies to date have been

performed on the relatively 'well' elderly; thus, caution is needed when extrapolating therapy and results to the frail.

- Drug interactions should be considered since most elderly patients are taking medications for other medical problems.

#### Which drug do I use?

The JNC 7 recommends thiazide diuretics as the initial treatment for hypertension in elderly patients without comorbid conditions.<sup>1</sup> These medications are relatively safe (although you must check for hypokalaemia after starting treatment), are cheap and reduce urinary calcium excretion. Recently published Australian data (from the ANBP2, the Second Australian National Blood Pressure Study) have found that ACE inhibitors are just as effective as diuretics in reducing blood pressure. They also showed that patients (particularly men) treated with ACE inhibitors had better cardiovascular outcomes than those treated with diuretics.<sup>12</sup>

**Table 5. Patients with comorbidities: suggested first line antihypertensive medications**

Comorbid condition	Suggested first line antihypertensive medication	Comments
Heart failure Osteoporosis	Diuretics (thiazides for osteoporosis)	May exacerbate gout
Ischaemic heart disease Tachyarrhythmia Compensated heart failure Migraine	Beta blockers	May cause bradycardia Contraindicated in patients with bronchospastic disorders Avoid in patients with peripheral vascular disease
Diabetes mellitus, impaired fasting glucose and impaired glucose tolerance Systolic dysfunction Chronic renal failure (mild–moderate)	ACE inhibitors or angiotensin receptor blockers	Check serum potassium and creatinine after starting medication Tolerate up to 20% increase in serum creatinine
Angina Diastolic dysfunction Peripheral vascular disease	Calcium antagonists	Avoid nondihydropyridine calcium antagonists in patients with heart block
Prostatism Dyslipidaemia	Alpha blockers	Can cause postural hypotension

continued

Patients with comorbid conditions should have their therapeutic regimen individually tailored. Table 5 lists suggested first line antihypertensive medications according to various comorbid conditions.

Interestingly, it has been shown also that older medications (beta blockers and diuretics) are just as effective as newer antihypertensives (felodipine, enalapril, lisinopril and isradipine) in preventing cardiovascular mortality.<sup>13</sup>

## What should I consider if things don't add up?

### White coat hypertension

The incidence of falsely high blood pressure readings is greater in the elderly than in younger subjects. The diagnosis of white coat hypertension should be considered when patients have great variability in their blood pressure or a long history of hypertension without any evidence of end organ damage. White coat hypertension is more common in the elderly, especially women. It can account for up to 30% of all hypertension diagnosed in the office but can be ruled out effectively by ambulatory blood pressure monitoring or obtaining blood pressure readings outside the

office. Patients with white coat hypertension have a lower cardiovascular risk than those with sustained hypertension, but it may be a warning of things to come – each year 10% of these patients will develop sustained hypertension.

### Resistant hypertension

Resistant hypertension is a frustrating problem for which there is sometimes a simple answer. Some of the causes to reconsider are listed in Table 6.

### Conclusion

There is mounting evidence that the treatment of hypertension in the elderly provides improvement in morbidity and mortality. Although treatment of the high blood pressure is a priority, important considerations must be made in developing a treatment regimen. **MT**

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### Table 6. Some causes of difficult to treat hypertension

- Poor patient compliance with medication due to complex drug regimen or unpleasant side effects
- Suboptimal therapy; most patients need more than one agent to treat hypertension
- High salt diet
- Ingestion of NSAIDs
- White coat hypertension
- Pseudohypertension
- Inappropriate blood pressure measurement technique
- Secondary hypertension

## Call for case studies

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