



Dr. Dalia Alsanea

Consultant Family medicine

Head of Surra Clinic

FMRP, KIMS (Certified trainer and examiner)

KFMPR assistant director of academic affair, OSCE exam
convener

Hypertension in adults:
diagnosis and management

Clinical Practice Guidelines

NICE guideline
Published: 28 August 2019
www.nice.org.uk/guidance/ng136

2020 International Society of Hypertension Global Hypertension Practice Guidelines



ESC

European Society
of Cardiology

European Heart Journal (2018) **39**, 3021–3104
doi:10.1093/eurheartj/ehy339

ESC/ESH GUIDELINES

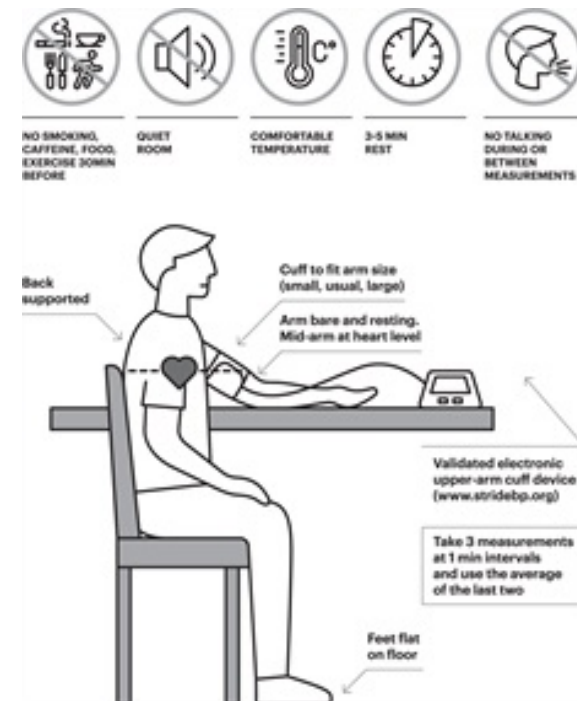
Current
Situation



Diagnosis

TABLE 3 - Advantages and limitations of OBP measurements

Advantages	Limitations
<ul style="list-style-type: none"> • Readily available in most healthcare settings. • Strong data linking OBP with CVD. • Used in most observational and interventional outcome trials in hypertension 	<ul style="list-style-type: none"> • Often poorly standardised leading to overestimation of BP. • Inadequate reproducibility, with single-visit OBP having low diagnostic precision in an individual. • Subject to WCH (reduced but still present with standardised measurements taken in repeated visits). • Will not detect MH.



Out of office BP

Hypertension Diagnosis – Out-of-Office Blood Pressure Measurement

- Out-of-office BP measurements (by patients at home or with 24-hour ambulatory blood pressure monitoring [ABPM]) are more reproducible than office measurements, more closely associated with hypertension-induced organ damage and the risk of cardiovascular events and identify the white coat and masked hypertension phenomena (see below).
- Out-of-office BP measurement is often necessary for the accurate diagnosis of hypertension and for treatment decisions. In untreated or treated subjects with office BP classified as high-normal BP or grade 1 hypertension (systolic 130–159 mm Hg and/or diastolic 85–99 mm Hg), the BP level needs to be confirmed using home or ambulatory BP monitoring (Table 5).^{1,2,17,21}
- Recommendations for performing home and ambulatory BP measurement are presented in Table 5.

TABLE 8 - Advantages and limitations of HBPM

Advantages	Limitations
<ul style="list-style-type: none">• Widely available at relatively low cost.• Preferred method for long-term monitoring of treated hypertensive patients.• Acceptable to patients for long-term use.• Detects WCH and MH.• Confirms uncontrolled and resistant hypertension.• Detects excessive BP lowering from drug treatment.• Improves adherence with treatment and thereby hypertension control rates.• Can be used with telemonitoring and connection to electronic patient files.• Can reduce healthcare costs.	<ul style="list-style-type: none">• Requires medical supervision.• Inaccurate devices and inappropriate cuff size often used.• Monitoring may be too frequent, in the presence of symptoms, and under inappropriate position.• May induce anxiety to some patients.• Risk of unsupervised treatment changes by patients.• Possible selective reporting of BP readings by patients (usually omitting higher BP values).• Doctors may estimate instead of calculating average home BP.• No information on BP at work or during sleep (novel HBPM devices under testing measure BP during sleep).

OBP

Conditions	<ul style="list-style-type: none"> • Quiet room with comfortable temperature. • Before measurements: Avoid smoking, caffeine and exercise for 30 min; empty bladder; remain seated and relaxed for 3–5 min. • Neither patient nor staff should talk before, during and between measurements.
Positions	<ul style="list-style-type: none"> • Sitting: Arm resting on table with mid-arm at heart level; back supported on chair; legs uncrossed and feet flat on floor (Figure 1).
Device	<ul style="list-style-type: none"> • Validated electronic (oscillometric) upper-arm cuff device. Lists of accurate electronic devices for office, home and ambulatory BP measurement in adults, children and pregnant women are available at www.stridebp.org.²² (see also Section 11: Resources) • Alternatively use a calibrated auscultatory device. (aneroid, or hybrid as mercury sphygmomanometers are banned in most countries) with 1st Korotkoff sound for systolic blood pressure and 5th for diastolic with a low deflation rate.²²
Cuff	<ul style="list-style-type: none"> • Size according to the individual's arm circumference (smaller cuff overestimates and larger cuff underestimates blood pressure). • For manual auscultatory devices the inflatable bladder of the cuff must cover 75%–100% of the individual's arm circumference. For electronic devices use cuffs according to device instructions.
Protocol	<ul style="list-style-type: none"> • At each visit take 3 measurements with 1 min between them. Calculate the average of the last 2 measurements. If BP of first reading is <130/85 mmHg no further measurement is required.
Interpretation	<ul style="list-style-type: none"> • Blood pressure of 2–3 office visits \geq140/90 mmHg indicates hypertension.

Hypertension Diagnosis – Office BP Measurement

- The measurement of BP in the office or clinic is most commonly the basis for hypertension diagnosis and follow-up. Office BP should be measured according to recommendations shown in Table 3 and Figure 1. ^{1,2,17,18}
- Whenever possible, the diagnosis should not be made on a single office visit. Usually 2–3 office visits at 1–4-week intervals (depending on the BP level) are required to confirm the diagnosis of hypertension. The diagnosis might be made on a single visit, if BP is \geq 180/110 mm Hg and there is evidence of cardiovascular disease (CVD). ^{1,2,17,18}
- The recommended patient management according to office BP levels is presented in Table 4.
- If possible and available, the diagnosis of hypertension should be confirmed by out-of-office BP measurement (see below). ^{1,2,19–21}

الفترة المسائية		الفترة الصباحية		التاريخ	اليوم
القياس الثاني	القياس الأول	القياس الثاني	القياس الأول		
					1
					2
					3
					4
					5
					6
					7
				متوسط القراءات لست أيام ابتداء من اليوم الثاني	

White-coat hypertension and masked hypertension

White-coat hypertension refers to the condition in which BP is elevated in the office, but is normal when measured by ABPM, HBPM, or both.

Conversely, 'masked hypertension' refers to patients in whom the BP is normal in the office, but is elevated when measured by HBPM or ABPM.

Confirm the diagnosis



Clinic blood pressure of 140/90 mmHg or higher and

140/90



Out of office: ABPM daytime average or HBPM average of 135/85 mmHg or higher.

135/85



White-coat HTN Vs. Masked HTN

- White coat HTN

Refers to the condition in which BP is elevated in the office, but is normal when measured by ABPM, HBPM, or both.


- Masked HTN

Refers to patients in whom the BP is normal in the office, but is elevated when measured by HBPM or ABPM.



Office BP

High	White-coat hypertension 15-25%	Sustained hypertension
Low	Normotension	Masked hypertension 10-20%
	Low	High



Home or Ambulatory BP



Staging HTN

NICE National Institute for
Health and Care Excellence

Stage 1 hypertension	Clinic BP \geq140/90 mmHg and subsequent ABPM daytime average or HBPM average \geq135/85 mmHg.
Stage 2 hypertension	Clinic BP \geq 160/100 mmHg and subsequent ABPM daytime average or HBPM average \geq 150/95 mmHg.
Severe hypertension	Clinic systolic BP \geq 180 mmHg or clinic diastolic BP \geq 110 mmHg.

European

Table 3 Classification of office blood pressure^a and definitions of hypertension grade^b

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

BP = blood pressure; SBP = systolic blood pressure.

^aBP category is defined according to seated clinic BP and by the highest level of BP, whether systolic or diastolic.

^bIsolated systolic hypertension is graded 1, 2, or 3 according to SBP values in the ranges indicated.

The same classification is used for all ages from 16 years.

Initial visit

Confirm the diagnosis of HTN

Stage the hypertension

Rule out 2ry causes

Assess other CV risk factors

Assess end organ damage

Assess CVD 10-year risk

Management plan

Types of HTN

Primary HTN:

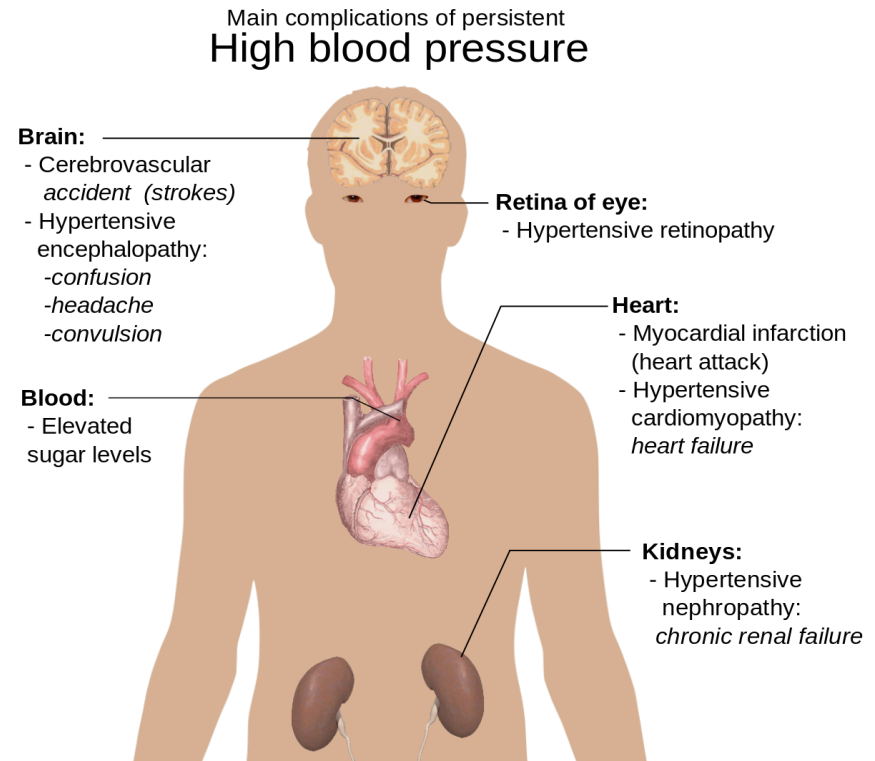
- also known as essential HTN.
- accounts for 95% cases of HTN.
- no universally established cause known.

Secondary HTN:

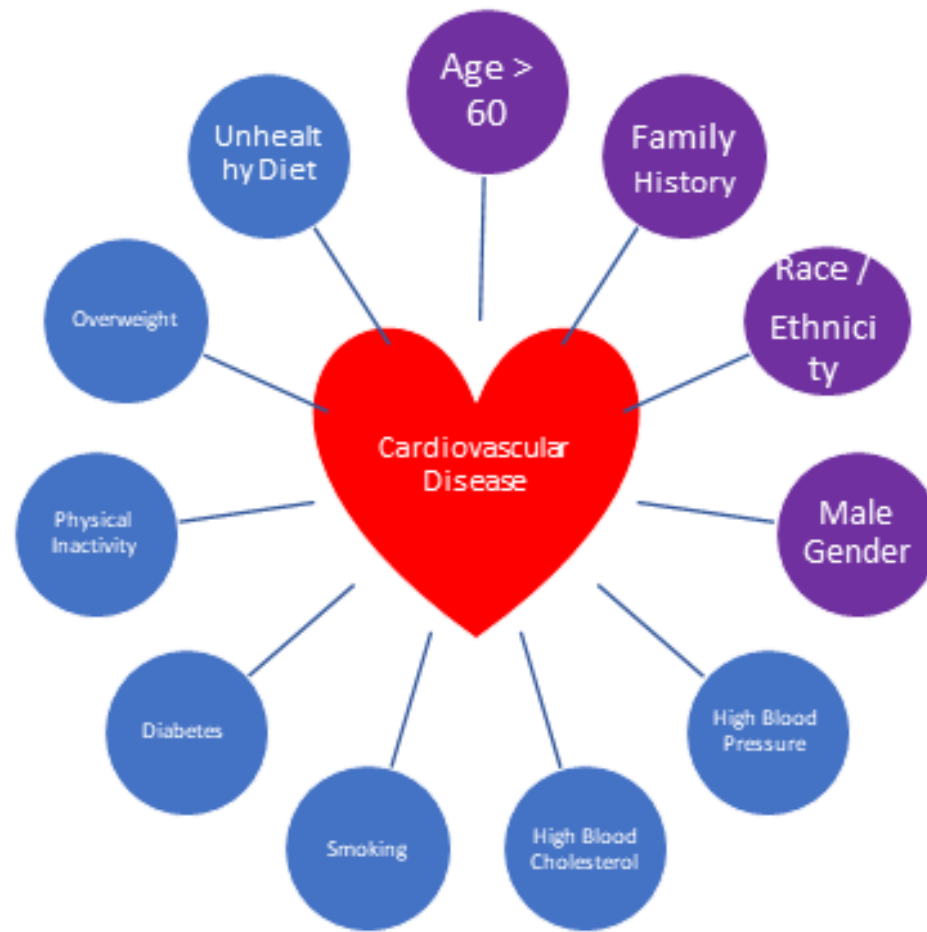
- less common cause of HTN (5%).
- secondary to other potentially rectifiable causes (Renal, Endocrine, Vascular, Pregnancy related & Drug induced).

HMOD

- Brain: TIA, stroke, vascular demntia
- Heart:
 - 1- symptoms of failure or ECG strain
 - 2- angina, MI or other coronary disease
- Eye: fundal hemorrhage or papilloedema
- Kidney: protienuria, renal failure
- Peripheral vascular disease: claudication



Assess CVD risk



Assess 10-yr cv risk



- Use any validated CV risk assessment tool:
ASCVD, Framingham risk assessment, Q risk, UKPDS,



Framingham Risk Calculator

- Age
- Gender
- Smoker
- Total cholesterol
- HDL-C
- Systolic BP
- HTN Rx

Calculates 10-year risk for CHD death or nonfatal MI

Duke Heart Center

Calculation Profile: CVD Risk
 Estimation of 10 year Cardiovascular Disease Risk
 Reference: Anderson et al. CCS Dyslipidemia Guidelines Update 2012

Risk Factor:

- Sex: Female (Points: 2)
- Age (30 - 75): 30 (Points: 0)
- Smoker: No (Points: 0)
- Diabetic: No (Points: 0)
- Blood Pressure: 0 / 0 mm Hg (Points: -3)
- Blood Pressure is Treated: [] (Points: 0)
- Total Cholesterol: 0 mmol/L (Points: 0)
- HDL Cholesterol: 0 mmol/L (Points: 0)
- Cardiovascular disease family history in first degree relatives before 55 for men or 65 for women: [] (Points: 0)

Total Points: -1
 Risk of heart disease in 10 years: 1.0%

SCORE

HbA1c: 6.5 %
 Systolic BP: 130 mm Hg
 Total cholesterol: 110 mg/dl
 LDL cholesterol: 50 mg/dl

Options >

Adjusted for regression dilution

Fatal stroke: 3.8%

Calculate Copy Print Help Exit

New ASCVD Risk Calcul

- New risk tool was needed with greater emphasis on
 - African Americans & other races
 - Women
 - Stroke as an outcome
 - Geographic and SES diversity
- Pooled Cohort Equation
 - 2010 re-estimates Risk in Communities (MCC)
 - Cardiovascular Health Study (CHS)
 - Coronary Artery Risk Development in Young Adults (CARDIA)
 - Framingham Original and Offspring studies
- ASCVD events
 - CHD events
 - Non-fatal MI
 - Stroke (fatal or non-fatal)
- Internal and external validation

Duke Heart Center





- **Investigation:**

1. ECG, Chest X-ray (Base Line to r/o Left ventricular hypertrophy, T wave changes, cardiomegaly)
2. CBC
3. TFT
4. FBS, HbA1c (R/O Diabetes)
5. Lipid profile (Total Cholesterol, LDL, HDL r/o ASCVD risk score)
6. Urea, electrolyte & Serum Creatinine
7. Urinalysis (R/O hematuria & albumin/creatinine ratio)
8. eGFR
9. Annually Fundoscopy (r/o hypertensive retinopathy)

Management plan



Whom to treat?



When to treat?



What are the management options?



What to start with?

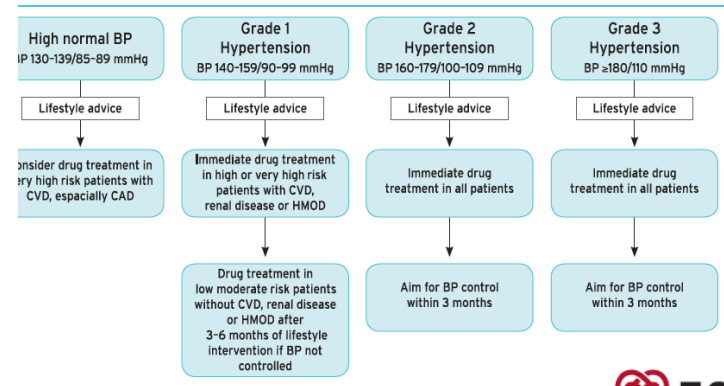


How to monitor the response?

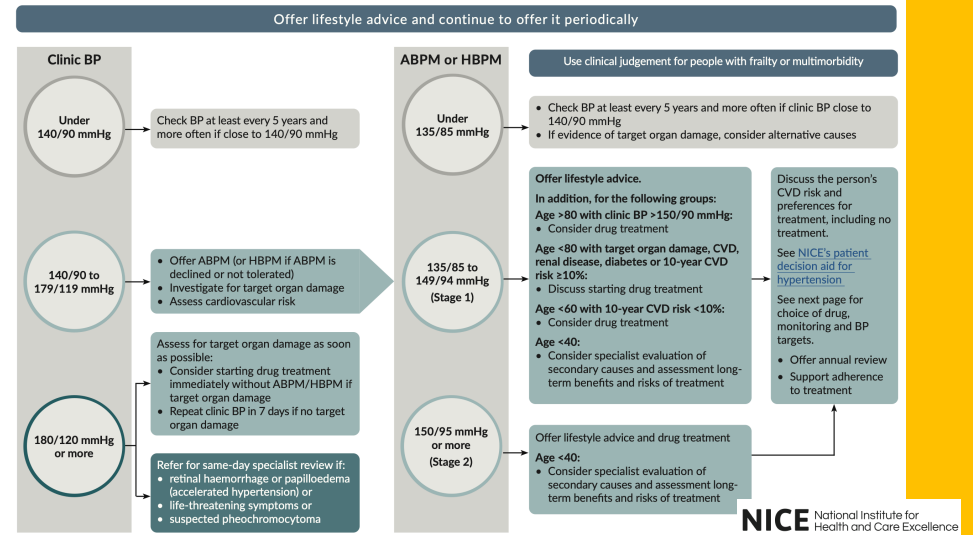


What is the target?

When/whom to treat?



- Initiation of blood pressure-lowering drug treatment in patients with high-normal blood pressure.



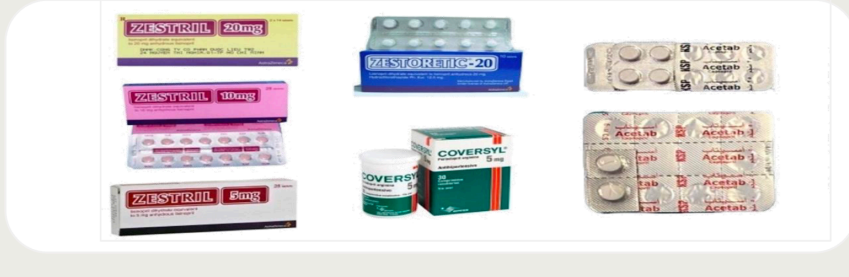


Pharmacotherapy



• **ACEI:**

- Zestril (**lisinopril**): 5mg, 10mg, 20mg OD/BD – maximum dose 20mg per day.
- Zestoretic (**lisinopril with thiazide diuretic**): 20mg/12.5mg OD - maximum dose 20mg per day.
- Coversyl (**prindopril**): 5mg, 10mg OD/BD - max 10mg. Available for Kuwaitis only.
- Capoten, Acetap (**captopril**): 25mg, 50mg BD/TDS - maximum 150mg per day.
- Triace (**ramipril**): 2.5mg, 5mg OD/BD - maximum 10mg per day. Not available in polyclinics.



• **ARBs Available in polyclinics for Kuwaiti patients only:**

- Diovan (**valsartan**): 80mg, 160mg OD/BD - maximum 320mg per day
- Co-Diovan (**valsartan with thiazide**): 80mg/12.5mg, 160mg/12.5mg OD/BD - maximum dose 320mg/25mg per day
- Micardis (**telmisartan**): 40mg, 80mg OD/BD - Maximum dose 80mg per day
- Micadis plus (**telmisartan with thiazide**): 40mg/12.5mg OD/BD, 80mg/12.5mg OD - maximum dose 80mg per day
- Atacand (**candesartan**): 8mg, 16mg OD/BD – maximum dose 16mg per day
- Atacand plus (**candesartan with thiazide**): 16mg/12.5mg OD - maximum dose 16mg per day





• **CCB:**

1. Not related to Heartrate:
 - Norvasc (**amlodipine**): 5mg OD/BD – maximum dose 10mg/day. Available for Kuwaitis only.
 - Lercadip (**lercadipine**): 10mg, 20mg - maximum 20mg. Not available in polyclinics.
 - Istin (**amlodipine**): 10mg OD – maximum dose 10mg. Available for Kuwaitis only.
 - Adalat R (**nifedipine**): 30mg OD, BD, TDS - max 90mg. Not available in polyclinics.
2. Decrease HR & Contraindicated with Beta Blockers due to Heart block:
 - Isoptin (**verapamil**): 80mg TDS, 240mg retard OD – maximum dose 240mg.
 - Dilzem (**diltiazem**): 30mg, 60mg, 90mg R OD/BD/TDS - initial dose 120mg, maximum 540mg.



• **Betablockers:**

- Indural (**propranolol**): 10mg OD, BD, TDS – maximum 240mg.
- Lopresor (**metoprolol**): 50mg, 100mg OD – maximum 100mg.
- Concor (**bisoprolol**): 2.5mg, 5mg, 10mg OD – maximum 10mg.
- Tenormin (**atenolol**): 50mg, 100mg OD – maximum 100mg.
- Tenoretic (**atenolol with thiazide**): 100mg/25 OD maximum dose.



• Alpha Agonist:

- Physotens (**Moxonidine**) 0.2mg, 0.4mg OD – maximum 0.6mg.
- Aldomet (**Methyl dopa**): 250mg, 500mg BD/TDS – maximum 1500mg.



• Diuretics:

- Thiazide:
 1. Moduretic (**Amiloride HCL + Hydrochlorothiazide**): 50mg/5mg OD.
 2. Esidrex (**Hydrochlorothiazide**): 25mg OD/BD – maximum dose 100mg.
 3. All Co or plus medications max 25mg of diuretic.
- Thiazide-Like
 1. Natrilix sustained release (**Indapamide**): 1.5mg, 2.5mg – maximum dose 2.5mg. Available for Kuwaitis only.
 2. Hygroton (**Chlorthalidone**): 12.5mg OD – maximum dose 25mg.
- Spirolactones (K sparing):
 1. Aldactone antagonist and antiandrogenic (**Spirolactone**): 25mg, 50mg, 100mg OD, BD – maximum 100mg.

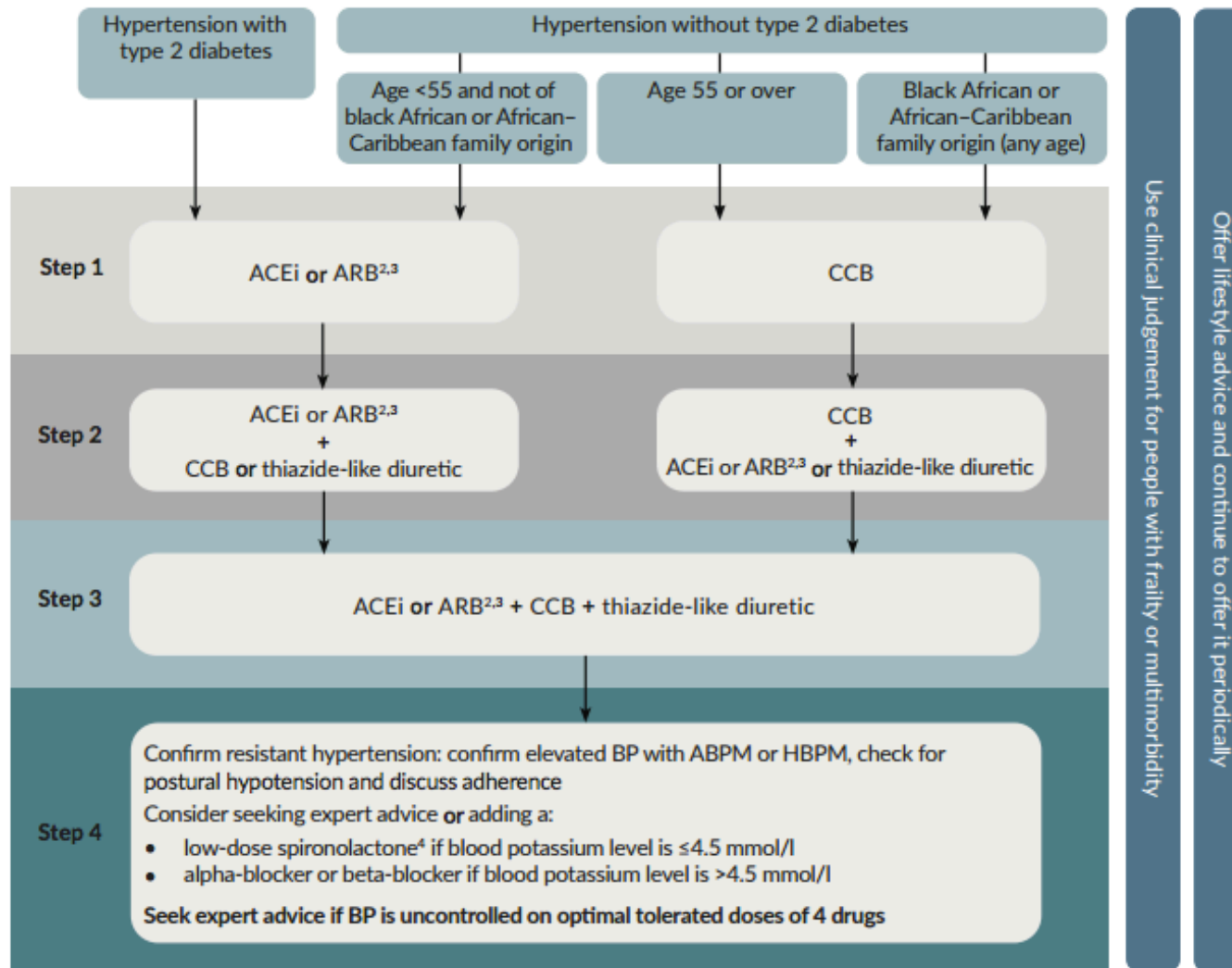


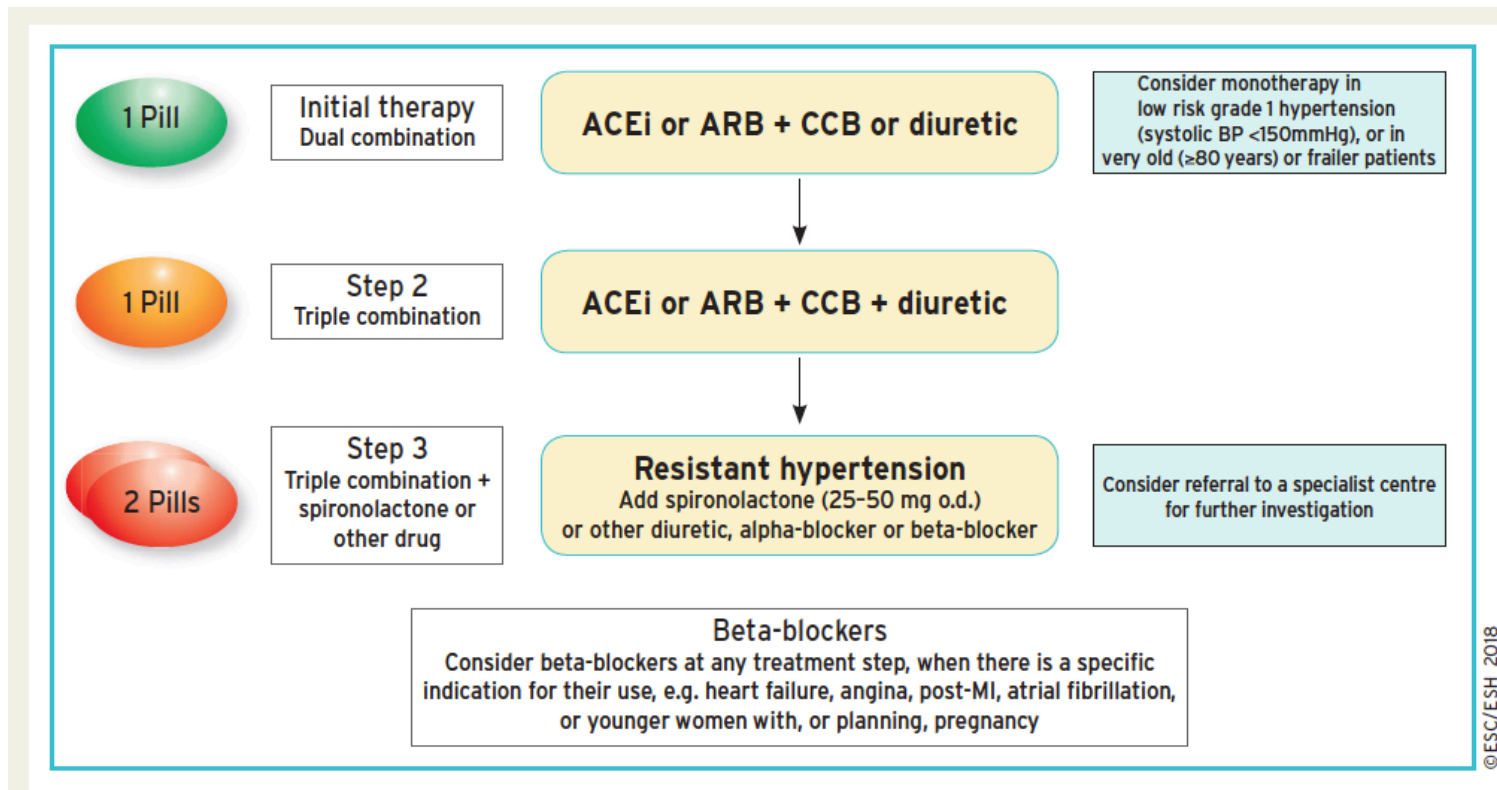
- **Other Combination Drugs:**

- Exforge (**Amlodipine and Valsartan**): 5mg/160mg, 10mg/160mg OD.
- Exforge Hct (**Valsartan/Amlodipine/Hydrochlorothiazide**): 5mg/160mg/12.5mg, 10mg/160mg/12.5mg OD.
- Coveram (**Perindopril/Amlodipine**) 5mg/5mg, 5mg/10mg, 10mg/10mg OD.



Choice of antihypertensive drug¹, monitoring treatment and BP targets





Monitoring the response

Monitoring treatment

Use clinic BP to monitor treatment.

Measure standing and sitting BP in people with:

- type 2 diabetes or
- symptoms of postural hypotension or
- aged 80 and over.

Advise people who want to self-monitor to use HBPM. Provide training and advice.

Consider ABPM or HBPM, in addition to clinic BP, for people with white-coat effect or masked hypertension.

BP targets

BP targets

Reduce and maintain BP to the following targets:

Age <80 years:

- Clinic BP <140/90 mmHg
- ABPM/HBPM <135/85 mmHg

Age ≥80 years:

- Clinic BP <150/90 mmHg
- ABPM/HBPM <145/85 mmHg

Postural hypotension:

- Base target on standing BP

Frailty or multimorbidity:

- Use clinical judgement

NICE National Institute for Health and Care Excellence



Table 23 Office blood pressure treatment target range

Age group	Office SBP treatment target ranges (mmHg)					Office DBP treatment target range (mmHg)
	Hypertension	+ Diabetes	+ CKD	+ CAD	+ Stroke ^a /TIA	
18-65 years	Target to 130 or lower if tolerated Not <120	Target to 130 or lower if tolerated Not <120	Target to <140 to 130 if tolerated	Target to 130 or lower if tolerated Not <120	Target to 130 or lower if tolerated Not <120	70-79
65-79 years ^b	Target to 130-139 if tolerated	Target to 130-139 if tolerated	Target to 130-139 if tolerated	Target to 130-139 if tolerated	Target to 130-139 if tolerated	70-79
≥80 years ^b	Target to 130-139 if tolerated	Target to 130-139 if tolerated	Target to 130-139 if tolerated	Target to 130-139 if tolerated	Target to 130-139 if tolerated	70-79
Office DBP treatment target range (mmHg)	70-79	70-79	70-79	70-79	70-79	

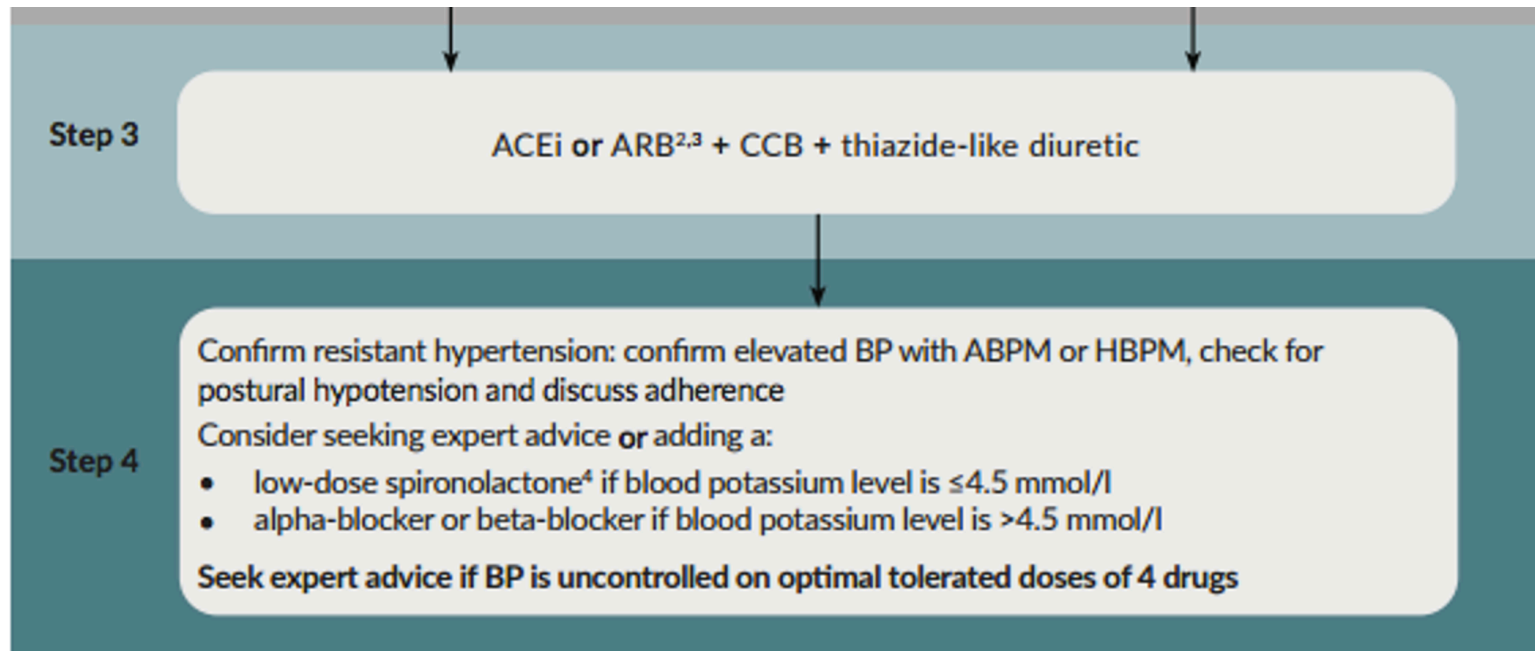
©ESC/ESH 2018

Resistant hypertension

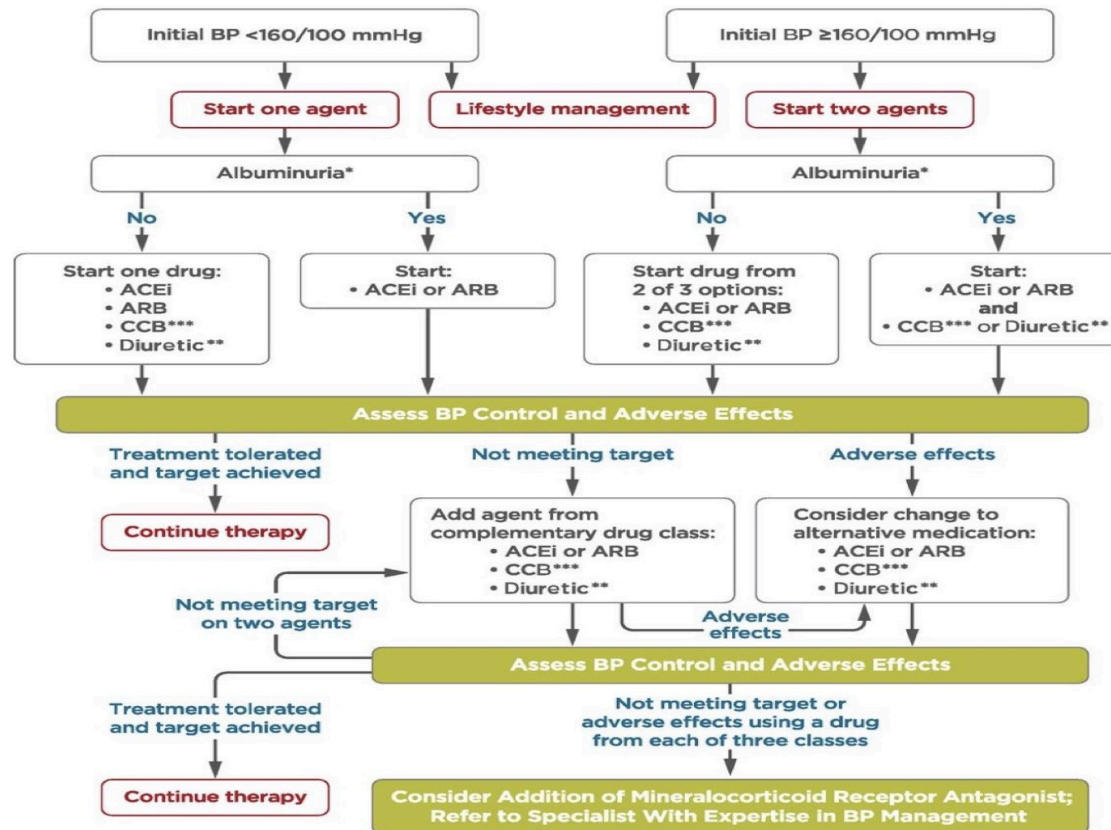
Hypertension is defined as resistant to treatment when the recommended treatment strategy fails to lower office <140 mmHg and/or <90 mmHg, and the inadequate control of BP is confirmed by ABPM or HBPM in patients whose adherence to therapy has been confirmed.

Patients with resistant hypertension are at higher risk of HMOD, CKD, and premature CV events.

Resistant HTN



Recommendations for the Treatment of Confirmed Hypertension in People With Diabetes



Follow-up Visit



4 CS



ASSESS RISK
FACTORS (NEW,
ONGOING)



ASSESS HMOD



CALCULATE 10-
YEAR CV RISK



NEEDED TESTS
(LAB AND
OTHERS)



MANAGEMENT
PLAN

Referral to 2^{rt} care

- **Specialist referral:**

- Consider in patients with signs and symptoms suggesting secondary cause of hypertension. Patients with clinic BP $\geq 180/120$ mmHg and signs of retinal hemorrhage/papilledema, or life-threatening symptoms, and patients with suspected pheochromocytoma require immediate referral.
- Consider in patients with symptoms of, or documented, postural hypotension (fall in systolic BP when standing of 20mmHg or more).
- Consider if < 40 years.

Thank you



CHRONIC DISEASES IN PRIMARY HEALTH CARE CLINICAL PRACTICE GUIDELINES



برنامج التصدي للأمراض المزمنة غير المعدية
في الرعاية الصحية الأولية
NCD program in PHC