

# PHC

432 Team

## 18 TBL: Approach to patient with HTN



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# Objectives

Not given ><”

Slides **skipped** by the doctor are not covered; those include prevalence and extra abstracts of some studies

## Epidemiology

- › In developed and developing countries alike, Essential Hypertension affects 25-35% of the adult population. Up to 60-70% of those beyond the seventh decade of life. (Age increases the risk)
- › Each increment of 20 mm Hg in systolic blood pressure or 10 mm Hg in diastolic blood pressure (From the baseline which is 115/70 mm Hg) doubles the risk of cardiovascular disease events independent of other factors.

### In the Framingham Heart Study – prediction of cardiovascular events:

- › Those below **Age of 55** diastolic BP is the strongest predictor of cardiovascular risk.
- › **Above 55** years, diastolic BP was negatively related to the risk of coronary events, so the pulse pressure became superior predictor to the systolic Bp. (because of the arterial stiffness)

What happens to blood pressure with aging?

- › Systolic pressure increases with age.
- › Diastolic pressure increases with age but peaks between 55 and 60 years then starts to decrease.
- › Arterial stiffness: because of elevated systolic and lower diastolic pressure with aging.

## Diagnosis

- › **Two** or more elevated readings are obtained on at least two visits over a period of one to several weeks. (In real practice, you need more than 2; many patient will have it reduced by 10-15 in the 3<sup>rd</sup> visit. For the sake of the exam stick to the recommendation: 2 readings)

## Definitions and classification of blood pressure

Guidelines for the management of arterial hypertension. The task force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC)

	<b>Systolic</b>		<b>Diastolic</b>
<b>Optimal</b>	<120	And	<80
<b>Normal</b>	120–129	And/or	80–84
<b>High normal</b>	130–139	And/or	85–89
<b>Grade 1 HTN</b>	140–159	And/or	90–99
<b>Grade 2 HTN</b>	160–179	And/or	100–109
<b>Grade 3 HTN</b>	180	And/or	110
<b><u>Isolated systolic</u> HTN</b>	≥140	And	<90
<b>Grade 1 isolated HTN</b>	140–159	And	<90
<b>Grade 2 isolated HTN</b>	160–179	And	<90
<b>Grade 3 isolated HTN</b>	180	And	<90

- › If the clinic blood pressure is 140/90 mmHg or higher, offer ambulatory blood pressure monitoring (ABPM) to confirm the diagnosis of hypertension. (to exclude white coat hypertension)
- › If a person is unable to tolerate ABPM, home blood pressure monitoring (HBPM) is a suitable alternative to confirm the diagnosis of hypertension.

## ABPM:

- › At least two measurements per hour during the person's usual waking hours, average of at least 14 measurements to confirm diagnosis.



## Has to be considered:

- › Suspected white coat hypertension
- › Suspected episodic hypertension
- › Hypertension resistant to increasing medication
- › Hypotensive symptoms while taking antihypertensive medications

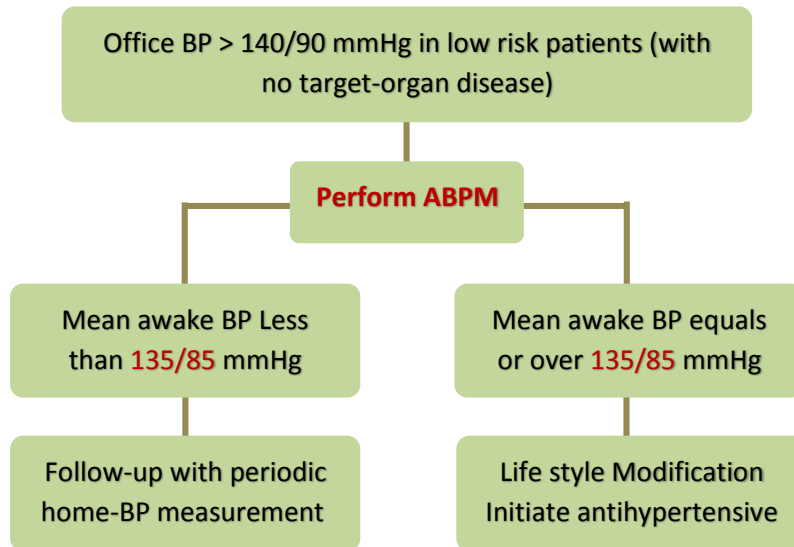
## HBPM: better as a predictor of BP

- › First way: Two consecutive seated measurements, at least 1 minute apart. Blood pressure is recorded twice a day for at least 4 days and preferably for a week. Measurements on the first day are discarded; average value of all remaining is used.
- › Second way: Morning and Evening, for an initial 7-day period.

## Has to be considered:

- › For the diagnosis of hypertension
- › Suspected non-adherence
- › White coat hypertension
- › Masked hypertension (normal at office high at home, more serious)

**In ABPM and HBPM, an average BP equal to or over 135/85 mmHg should be considered elevated.** (Any of these readings is considered HTN: During day 140/90, During **night** 125/75, Average 135/85) important during night, because in normal physiology there is dipping/drop by 10-15%, failure of this reduction is called “non-dipping” increases the risk of cardiovascular event, like in obstructive sleep apnea. However, excessive dipping increases the risk of stroke. E.g. night BP 110, at the day it suddenly increases to 140.



**NICE Guidelines: (Imp.)**

› **Stage 1 hypertension:**

- Clinic blood pressure (BP) is 140/90 mmHg or higher and ABPM or HBPM average is 135/85 mmHg or higher.

› **Stage 2 hypertension:**

- Clinic BP 160/100 mmHg is or higher and ABPM or HBPM daytime average is 150/95 mmHg or higher.

› **Severe hypertension:**

- Clinic BP is 180 mmHg or higher or Clinic diastolic BP is 110 mmHg or higher. Usually if diastolic is over 100/105 patient is hypertensive, not white coat syndrome.

	Threshold for <i>Stage 1</i> hypertension	Threshold for <i>Stage 2</i> hypertension
<b>Clinic BP</b>	<b>140/90mmHg</b>	<b>160/100mmHg</b>
<b>Ambulatory BP</b>	<b>135/85mmHg</b>	<b>150/95mmHg</b>

## Blood Pressure Assessment:

Patient preparation and posture (**important**). Standardized technique:

- › Posture: The patient should be calmly seated with his or her back well supported and arm supported at the level of the heart
- › His or her feet should touch the floor and legs should not be crossed.
- › **back not supported → diastolic increase by 6**
- › **arm not supported → BP increase by 10**
- › **crossed legs → BP increase by 9**
- › **other things: make sure he didn't smoke or drink a coffee**
- › Measurements should begin after at least 5 minutes of rest.
- › Appropriate size of Cuff. (**smaller ones increase BP**)
- › **If patient is on medication, s/he should take them *after* measuring the BP, so we'll be able to see the effect of the medication.**



## White-Coat Hypertension (*skipped*)

- › Raised clinic blood pressure in the presence of a normal daytime ambulatory blood pressure.
- › Results of Event-Based Studies have shown that the risk of cardiovascular disease is lower in patients with white-coat hypertension .
- › Check for any metabolic risk factor. If present, you have to start medication.

## Patient evaluation

- Evaluation of patients with documented HTN has **three objectives**:
  1. Assess lifestyle and identify other **CV risk factors** or concomitant disorders that affects prognosis and guides treatment.
  2. Reveal identifiable **Causes** of high BP.
  3. Assess the presence or absence of **Target Organ Damage and CVD**.

## Risk Factors

- ⊗ Smoking
- ⊗ Dyslipidemia
- ⊗ Diabetes Mellitus
- ⊗ Obesity
- ⊗ Age older than 60 years
- ⊗ Sex (men or postmenopausal women)
- ⊗ F.H. of cardiovascular disease (familial hypercholesterolemia)

## Who should be screened for causes of secondary hypertension?

Primary renal disease	Elevated serum creatinine concentration	
	Abnormal urinalysis	
Oral contraceptives	New elevation in blood pressure temporally related to use	
Pheochromocytoma	Paroxysmal elevations in blood pressure	
	Triad of headache (usually pounding), palpitations, and sweating	
Primary aldosteronism	Unexplained hypokalemia with urinary potassium wasting; however, more than one-half of patients are normokalemic	
Cushing's syndrome	Cushingoid facies, central obesity, proximal muscle weakness, and ecchymoses	
	May have a history of glucocorticoid use	
Sleep apnea syndrome	Primarily seen in obese men who snore loudly while asleep	Suspected if persistent case, or uncontrolled HTN
	Daytime somnolence and fatigue and morning confusion	



## Target Organ Damage

- › Heart:
  - ✦ Left ventricular hypertrophy (imp.)
  - ✦ Angina or prior myocardial infarction
  - ✦ Heart failure
- › Brain:
  - ✦ Stroke or transient ischemic attack
- › Chronic kidney disease (e.g. microalbuminuria, peripheral arterial disease)
- › Peripheral arterial disease
- › Retinopathy (all patients are referred to ophthalmology)

### Very high risk subjects:

- › BP 180 mmHg systolic and/or 110 mmHg diastolic
- › Systolic BP > 160 mmHg with low diastolic BP (<70 mmHg) (isolated HTN pt is the most difficult to treat, you give a medication to reduce high systolic but it lowers the diastolic also, which is dangerous because coronary perfusion occurs in the diastolic phase → ischemia) be cautious when treating them
- › Diabetes mellitus
- › Metabolic syndrome
- › ≥ 3 cardiovascular risk factors
- › One or more of the following subclinical organ damages:
  - ⊗ ECG with LVH and strain
  - ⊗ Echo. of concentric LVH (or suspecting HF)
  - ⊗ U/S evidence of carotid artery wall thickening or plaque
  - ⊗ Moderate increase in serum creatinine
  - ⊗ Reduced creatinine clearance
  - ⊗ Microalbuminuria or proteinuria
  - ⊗ Established cardiovascular or renal disease

## Approach a patient with Hypertension

- a. *Medical History*
- b. *Physical Examination*
- c. *Routine Laboratory Tests*
- d. *Optional Tests (e.g. suspecting HTN secondary to renal artery stenosis -> order ultrasound, affected kidney will look smaller than 9 cm)*
- e. *Treatment (Non-Pharmacological, drugs)*

### a. Medical history (remember it's a silent disease)

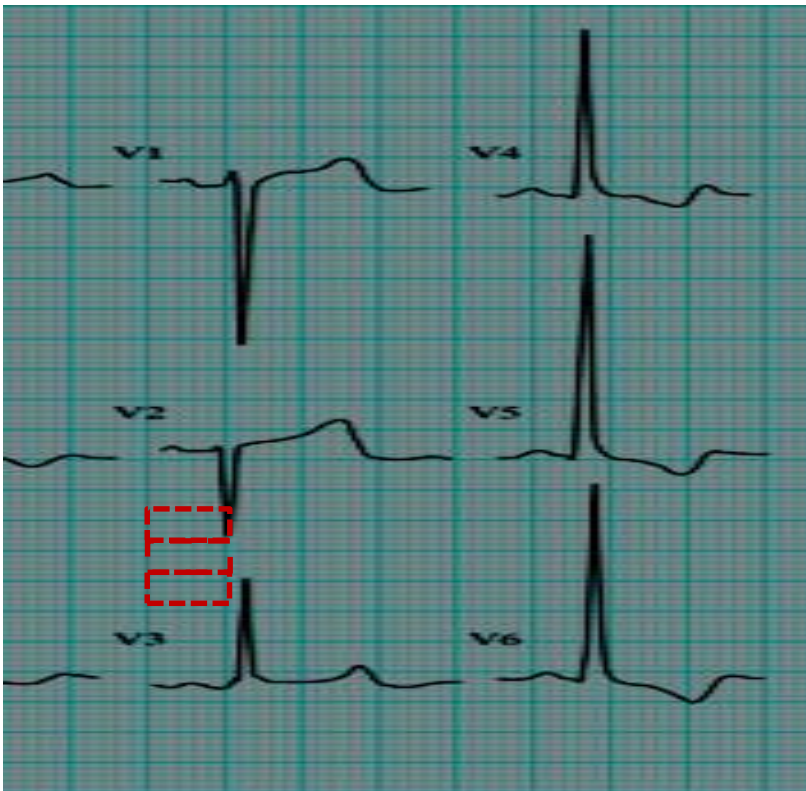
- › Personal History of Cardiovascular Disease
- › Current and Previous Medications
- › Smoking
- › Lifestyle Factors
- › Family History

### b. Physical examination

- › Blood Pressure
- › Height, Weight and Pulse
- › Exam. Of Neck, Heart, Lungs, Abdomen and Extremities
- › Funduscopic Examination (Arterial narrowing "copper wiring", A-V nicking, Flame shaped haemorrhages, Soft exudates, Papilloedema)

### c. Investigations-Routine laboratory tests

- › CBC
- › Urine Analysis and Microalbuminuria
- › Urea, Creatinine, Electrolytes, Uric Acid and Calcium
- › Fasting Plasma Glucose
- › Lipid Profile (T.ch, Trig, LDL and HDL)
- › **ECG** (mandatory for all newly diagnosed patients)
- › Chest X-ray (only if needed or suspecting cardiopulmonary disease, e.g. pt having SOB or lower limb edema)



Summate big squares of QRS  
in V1 or V2 + V5 or V6 =  $\geq 7$   
→ LVH

In this case; V2 QRS= 2.5

V6 QRS= 6.....  $2.5+6= 8.5$

High risk

#### d. Optional tests (for individual cases not mandatory)

- ☞ 24 hour Urinary Protein (not necessarily if we have albumin/creatinine ratio)
- ☞ Creatinine Clearance
- ☞ Echocardiography (e.g. pt with symptoms of HF)
- ☞ Ultrasonography
- ☞ Thyroid Stimulating Hormone
- ☞ 24 hour Urinary Vanil Mandelic Acid (pheochromocytoma)
- ☞ 24 hour Urinary Catechleamines
- ☞ 24 hour Urinary Free Hydrocortisol

#### e. Treatment

##### 1. Pharmacological:

###### › Target:

- Treating (Non-Diabetic) systolic BP and diastolic BP to targets that are **<140/90** is associated with decrease in CVD Complications.
- <140/90 mmHg for people with diabetes.
- Limited data suggest possible worsening of both renal and CVD outcomes if systolic blood pressure is lowered to < 110 mmHg. **In Diabetic pt.**

› **Benefits of lowering blood pressure**

The Clinical Trials had shown reduction in:

- Stroke 35 – 40%
- MI 20 – 25%
- Heart failure > 50%

› **Classes of Antihypertensive drugs**

• **Beta blockers**

- Atenolol (cardioselectiv)
- Bisoprolol
- Carvedilol (cardioselectiv)

- **ACE Inhibitors** (The risk for AD was 24% lower in those prescribed ACE inhibitor) best for LVH patient, when pt develops SE like angioedema or chronic cough, you can change to another group of drugs.

- **Captopril**
- **Lisinopril**
- **Enalapril**

- **Angiotensin II Receptor Blockers** (ARB therapy may cut the risk of Alzheimer's disease (AD) by reducing amyloid deposition in the brain)

- Losartan                      - Candesartan
- Valsartan                     - Irbesartan

- **Calcium Channel Blockers (Long Acting)**

- Nifedipine Retard (best for pregnant)
- Amlodipine
- Felodipine

- **Diuretics** (Thiazides - SE: hypokalemia hyponatremia liver, Indapamide SR)

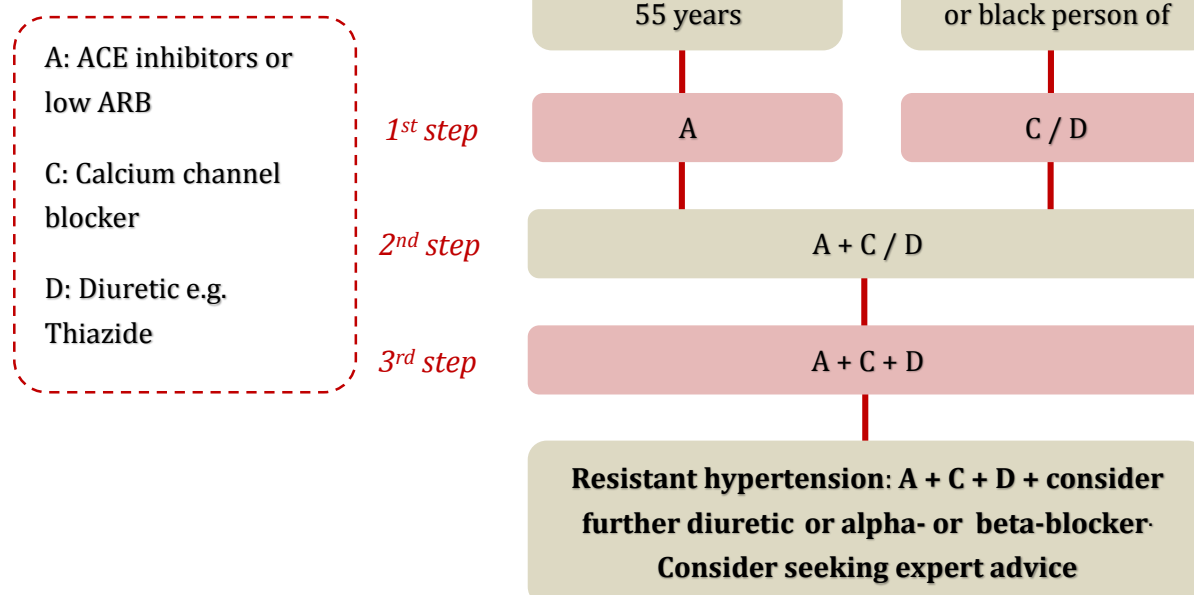
- **Vasodilators**

➤ **Guidelines recommend:**

1. All support **combination** therapy
2. Support initiation of therapy with drug combinations
3. Approve low-dose fixed combinations for initiation of therapy

Concept in pharmacological treatment: it's better and more effective in lowering BP to add another drug for your initial one rather than increase the dose.

**NICE Guidelines (imp.)**



**Explanation:**

- **In hypertensive patients aged 55 or older or black patients of any age:**
- ✦ *The first choice for initial therapy should be either a calcium-channel blocker or a Thiazide-type diuretic.*
  - ✦ *If a third drug is needed an ACE inhibitor or ARB is a choice.*

- **In hypertensive patients younger than 55, the first choice for initial therapy should be:**
  - ✦ *An ACE inhibitor (or an ARB if an ACE inhibitor is not tolerated).*
  - ✦ *Adding an ACE inhibitor to a calcium-channel blocker or a diuretic (or vice versa are logical combinations).*
  
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  - ✦ *Adding an ACE inhibitor to a calcium-channel blocker or a diuretic (or vice versa are logical combinations).*
  
- **Beta-blockers may be considered in younger people, particularly:**
  - ✦ *Those with an intolerance or contraindication to ACE inhibitors and ARB or*
  - ✦ *Child-bearing potential or*
  - ✦ *People with evidence of increased sympathetic drive.*
  - ✦ *If therapy is initiated with a beta-blocker and a second drug is required, add a calcium-channel blocker rather than a Thiazide-type diuretic to reduce the patient's risk of developing Diabetes.*

## JNC guidelines:

- › In patients  $\geq 60$  years of age, start medications at blood pressure of  $\geq 150/90$  mm Hg and treat to goal of  $< 150/90$  mm Hg
- › In patients  $\geq 60$  years of age, treatment does not need to be adjusted if achieved blood pressure is lower than goal and well-tolerated
- › In patients  $\leq 60$  years of age, start medications at blood pressure of  $\geq 140/90$  mm Hg and treat to goal of  $< 140/90$  mm Hg
- › In all adult patients with diabetes or chronic kidney disease, start medications at blood pressure of  $\geq 140/90$  mm Hg and treat to goal of  $< 140/90$  mm Hg

	Targets	Drug of choice
<b>Age 60-79</b>	$< 150/90$ mm Hg	CCB, thiazide
<b>Diabetes</b>	$< 140/90$ mm Hg	ACEI, ARB
<b>CKD</b>	$< 140/90$ mm Hg	—

*\* We're not supposed to know Canadian guidelines so I didn't cover them \**

## Studies on drugs

- ⌘  **$\beta$  blockers are associated with**
  - Increased risk for new-onset **DM by 22%**. (avoid combining them with **thiazides, both induce DM**)
  - No benefit for the end-point of death or MI.
  - Increased risk for **stroke by 15%**.
  - This risk was greater in patients with higher baseline **BMI** and higher baseline **FPG** (Fasting plasma glucose).
  - Lack of cardiovascular morbidity and mortality benefit.
  - Numerous adverse effects.
  - Lack of regression of target end-organ effects of hypertension (e.g., left ventricular hypertrophy and endothelial dysfunction).

- There is a paucity of data or an absence of evidence to support the use of beta-blockers as **Monotherapy** or as **First-line** agents in **uncomplicated HTN**.
- **Evidence on  $\beta$  blockers:**

Conditions	Weak to None	Some Evidence	Strong Evidence
Hypertension (uncomplicated)	✓		
Heart Failure			✓
Acute Coronary Syndrome		✓	
Post MI			✓
Stable Angina without MI		✓	
Perioperative (non cardiac)		✓	
HOCM		✓	

### ☞ Diuretics

- Meta-analysis of all RCTs support diuretics as **first line** agent.
- Clinical trials clearly supports using Diuretics as first line treatment for HTN including those with Diabetes, co-existing risk factors for CVD and asymptomatic LVH.
- Dose of Diuretic cannot be higher than an equivalent dose of 25 mg HCZ (hydrochlorothiazide).

### ☞ Antiplatelet agents

- **Primary Prevention:** For patients with elevated blood pressure and no cardiovascular disease, **ASA** cannot be recommended since the magnitude of benefit is negated by a harm of similar magnitude. (ARI 0.6 %, NNH 167 for 3.8 years)

## Initial drug choices

- › Isolated Systolic Hypertension:
  - Thiazides
  - Calcium Channel Blockers (Long Acting)
- › Peripheral Arterial Disease (BB CI)



- Calcium Channel Blockers (Long Acting)
- › Heart Failure:
  - ACE Inhibitors
  - Angiotensin II Receptor Blockers
  - Diuretics
  - B-Blockers
- › IHD and MI:
  - B-Blockers
  - ACE Inhibitors / Angiotensin II Receptor Blockers
  - Calcium Antagonists (Diltiazem)

## Special conditions

### 1. diabetes mellitus

- › ACE Inhibitors
- › Angiotensin II Receptor blockers
- › In Microalbuminuria and Nephropathy: lower systolic < 130 and diastolic < 80.
- › 9361 persons with a systolic BP of 130 or higher, with no diabetes, are randomized to a systolic BP <120 (intensive treatment) or a target of <140 (standard treatment)
- › Among patients at high risk for CV events but without diabetes, targeting a systolic BP < 120 as compared with < 140, resulted in lower rates of fatal and nonfatal major CV events and death from any cause.

### 2. White coat HTN – WCH

- › White coat hypertension is defined when a patient has a persistently elevated clinic BP  $\geq 140/90$  and a normal HBPM or ABPM day time average, i.e. <135/85
- › White coat hypertension is present in as many as 25% of patients, possibly leading to:
  - Incorrect diagnosis of hypertension.
  - Diagnosis of uncontrolled hypertension (receive inappropriate dose titrations or additional antihypertensive agents)
  - Resistant hypertension, with a reported prevalence of 37 to 44 % in some studies.

## 2. Non-pharmacological

<b>Lifestyle modifications to prevent and manage hypertension</b>	<b>Approximate Systolic BP Reduction</b>
<b>Weight reduction</b> Maintain normal body weight (body mass index 18.5–24.9 kg/m <sup>2</sup> ).	5–20 mmHg/10kg
<b>Adopt DASH eating plan</b> Consume a diet rich in fruits, vegetables, and low fat dairy products with a reduced content of saturated and total fat.	8–14 mmHg
<b>Dietary sodium reduction</b> Reduce dietary sodium intake to no more than 100 mmol per day (2.4 g sodium or 6 g sodium chloride).	2–8 mmHg
<b>Physical activity</b> Engage in regular aerobic physical activity such as brisk walking (at least 30 min per day, most days of the week).	4–9 mmHg

*Don't forget to go through the already distributed MCQ.. good luck ☺*

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