HYPERTENSION EPIDEMIOLOGY

Dr MOHD ALAM
SR COMMUNITY MEDICINE
HIMSR & HAHCH

CONTENT

INTRODUCTION

- Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure.

- Hypertension is diagnosed if, when it is measured on two different days, the systolic blood pressure readings on both days is ≥140 mmHg and/or the diastolic blood pressure readings on both days is ≥90 mmHg.

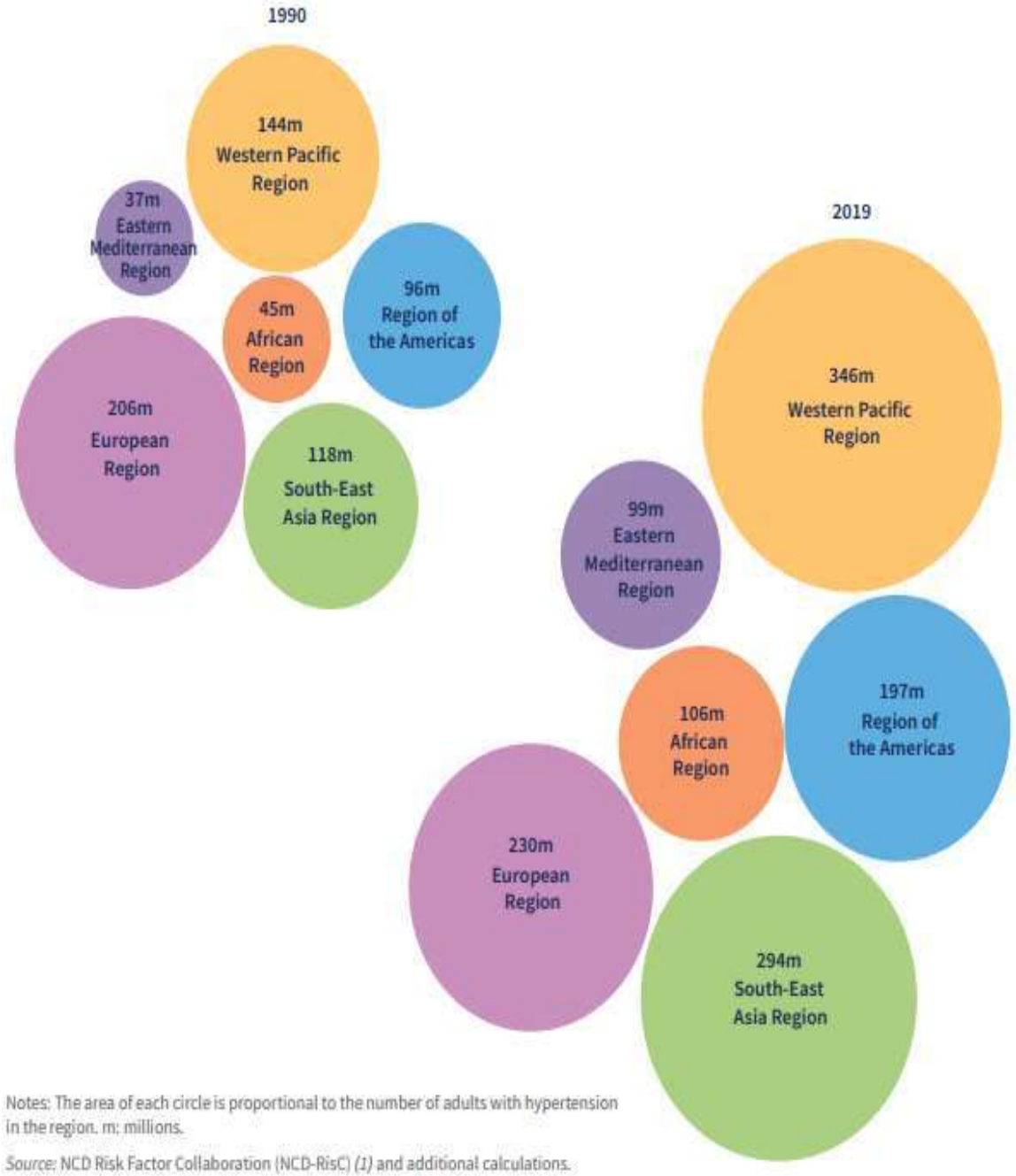
https://www.who.int/health-topics/hypertension#tab=tab_1
https://www.who.int/news-room/fact-sheets/detail/hypertension

GLOBAL BURDEN OF HYPERTENSION

- Hypertension is estimated to affect 33% of adults aged 30–79 worldwide
- The number of adults with hypertension doubled from 650 million in 1990 to 1.3 billion in 2019.
- About 78% of adults with hypertension live in low- and middle-income countries (LMICs). The greatest number of people with hypertension live in the most populous WHO regions: Western Pacific Region and South-East Asia Region.

https://www.who.int/publications/i/item/9789240081062

Fig. 3. Number of adults aged 30–79 years with hypertension, by region and year, 1990 and 2019



Notes: The area of each circle is proportional to the number of adults with hypertension in the region. m: millions.

Source: NCD Risk Factor Collaboration (NCD-RisC) *(1)* and additional calculations.

- Prevalence of hypertension is similar across groups of countries defined by income level with only a slight difference from 32% of adults aged 30–79 years in high-income countries to 34% in low-income countries.
- Regional and country variability is more notable. Regional variation ranges from 28% in the WHO Western Pacific Region to 38% in the WHO Eastern Mediterranean Region

https://www.who.int/publications/i/item/9789240081062

Table 2. Age-standardized prevalence of hypertension among adults aged 30–79 years, and among those with hypertension, diagnosis, treatment and effective treatment coverage in 2019, by WHO region

Region	Hypertension (%)	Diagnosis coverage (%)	Treatment coverage (%)	Effective treatment coverage[a] (%)
African	36 (38, 33)	43 (46, 39)	27 (30, 24)	12 (14, 9)
The Americas	35 (38, 33)	70 (73, 67)	60 (64, 57)	36 (41, 32)
South-East Asia	32 (36, 29)	39 (44, 34)	30 (34, 25)	14 (18, 10)
European	37 (39, 35)	66 (69, 63)	53 (56, 50)	26 (29, 23)
Eastern Mediterranean	38 (41, 35)	49 (53, 45)	39 (43, 34)	15 (19, 13)
Western Pacific	28 (32, 25)	54 (59, 48)	41 (47, 35)	18 (23, 14)
Global	33 (35, 32)	54 (56, 51)	42 (45, 40)	21 (23, 19)

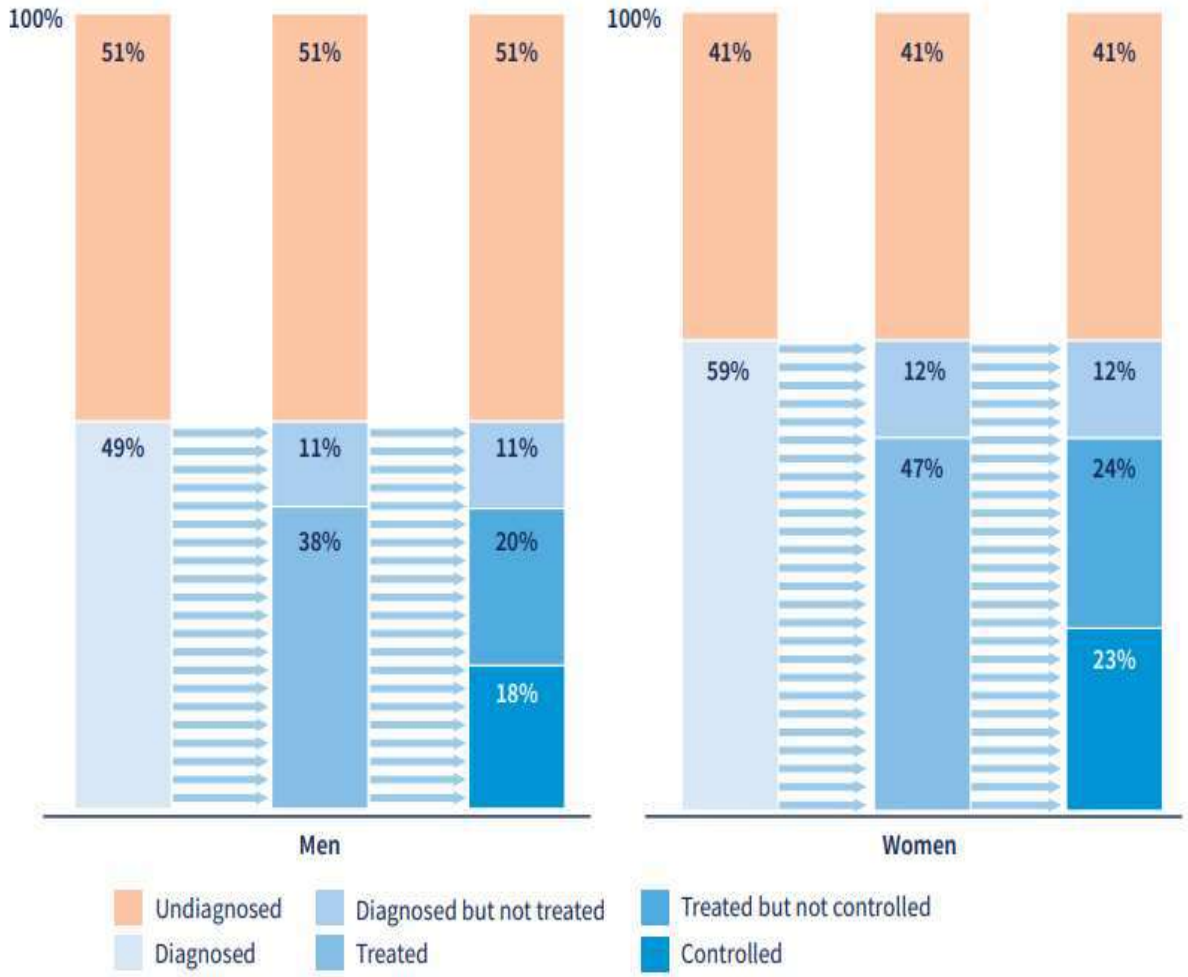
a. Controlled hypertension among all hypertension. Controlled hypertension is defined as blood pressure <140 mmHg systolic and <90 mmHg diastolic and taking medication for hypertension.

Note: Data in parentheses are 95% uncertainty intervals.

Source: Global Health Observatory (GHO). Noncommunicable diseases: risk factors [online database] *(4)*.

- Globally, the prevalence of hypertension is slightly higher among males (34%) than females (32%).
- The global age standardized prevalence of hypertension among people aged 30–49 years is 19% for women versus 24% for men. This pattern of lower hypertension prevalence among women aged under 50 years holds in most countries worldwide (15).
- people aged 50–79 years, both men and women globally are estimated to have equivalent hypertension prevalence of 49%.

Fig. 4. Hypertension treatment cascade in 2019, for adults 30–79 years of age globally, by sex. Age-standardized rates

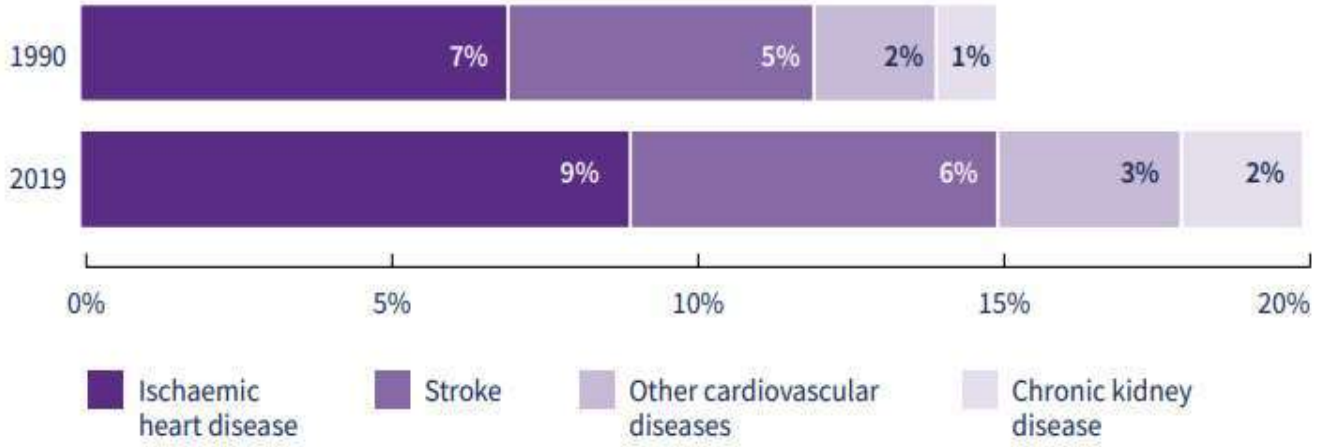


Source: NCD Risk Factor Collaboration (NCD-RisC) *(1)*.

https://www.who.int/publications/i/item/9789240081062

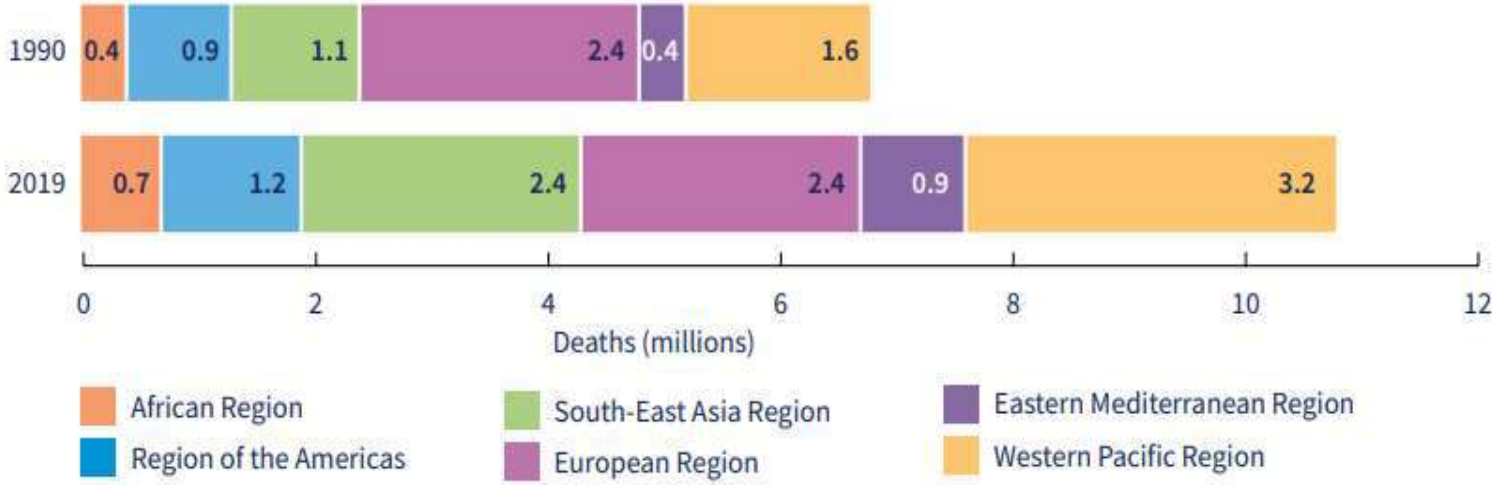
- If all adults had 110–115 mmHg SBP in 2019, about 19% of deaths would have been averted in that year.
- High systolic blood pressure is responsible for one in every five deaths

Fig. 8. Percentage of global deaths attributable to high systolic blood pressure (1990 and 2019), by cause of death



Source: Global Burden of Disease Collaborative Network *(25)* and additional calculations.

Fig. 9. Deaths attributable to high systolic blood pressure (1990 and 2019), by WHO region



Source: Global Burden of Disease Collaborative Network *(25)* and additional calculations.

https://www.who.int/publications/i/item/9789240081062

HYPERTENSION BURDEN IN INDIA

Table 2. Sociodemographic Variations in Care Continuum in India (N = 1691036)

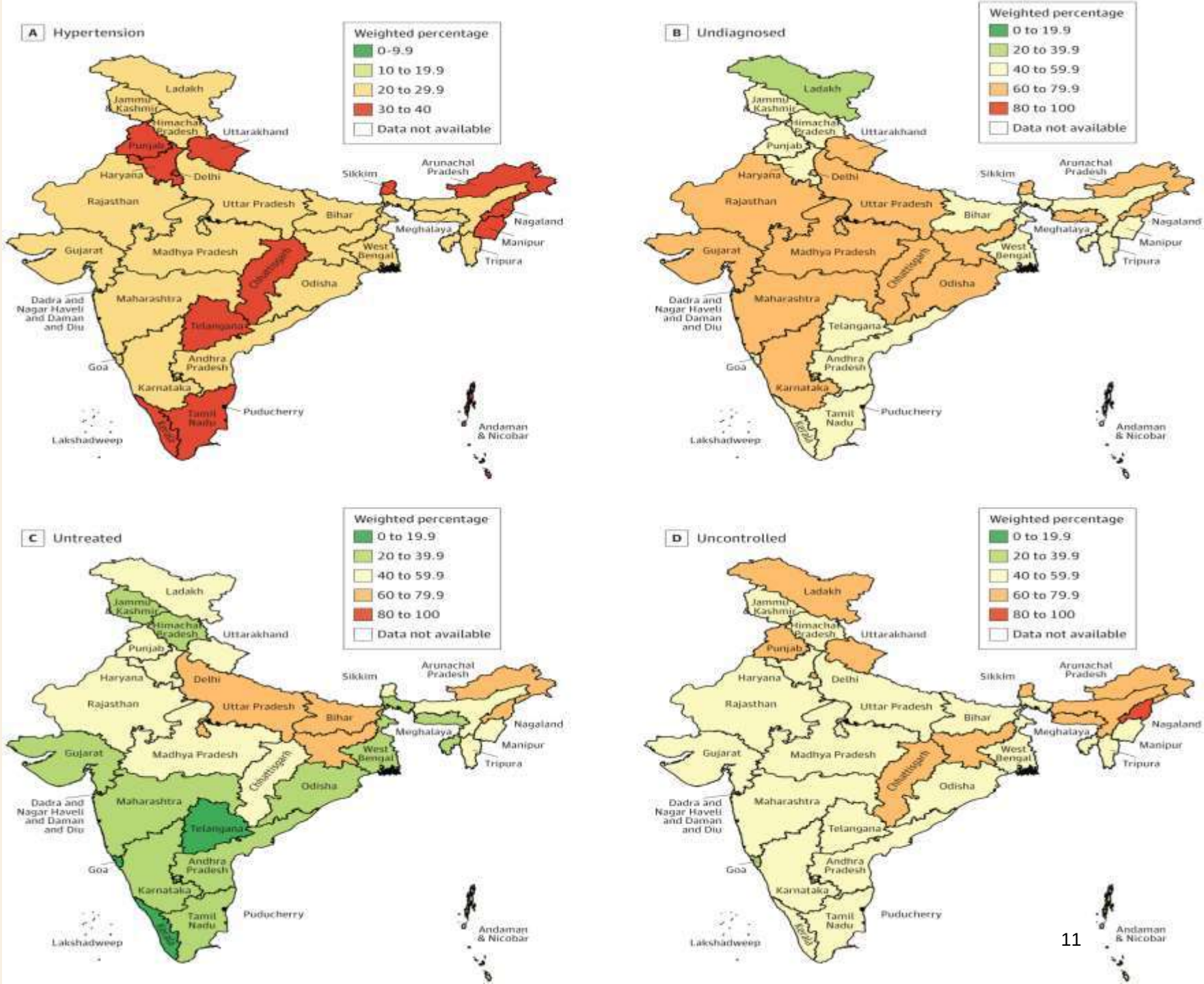
Characteristic	Participants, % (95% CI)[a]											
	Total				Urban				Rural			
	Hypertension	Diagnosed[b]	Treated[c]	Controlled[d]	Hypertension	Diagnosed[b]	Treated[c]	Controlled[d]	Hypertension	Diagnosed[b]	Treated[c]	Controlled[d]
Total	28.1 (27.9-28.3)	36.9 (36.4-37.3)	44.7 (44.1-45.3)	52.5 (51.7-53.4)	32.6 (32.2-33.0)	39.9 (39.1-40.8)	56.3 (54.9-57.6)	50.4 (49.0-51.9)	25.9 (25.7-26.1)	35.4 (34.8-35.9)	38.8 (38.0-39.6)	53.9 (52.9-55.0)
Sex												
Women	25.7 (25.5-25.9)	44.6 (44.0-45.1)	42.2 (41.5-42.9)	55.6 (54.6-56.6)	30.1 (29.7-30.5)	47.9 (46.8-48.9)	54.0 (52.5-55.5)	53.2 (51.4-55.0)	23.7 (23.5-23.9)	43.1 (42.4-43.8)	36.9 (36.0-37.8)	57.1 (55.8-58.4)
Men	30.6 (30.3-30.8)	28.4 (27.9-28.8)	49.3 (48.5-50.1)	47.4 (46.0-48.7)	35.1 (34.6-35.6)	32.2 (31.4-33.0)	59.9 (58.3-61.5)	46.4 (44.1-48.7)	28.2 (27.9-28.5)	26.3 (25.8-26.8)	42.8 (41.8-43.9)	48.1 (46.5-49.8)
Age category, y												
18-39	14.9 (14.8-15.1)	31.5 (30.8-32.2)	23.8 (22.9-24.7)	61.3 (59.7-62.9)	15.6 (15.2-15.9)	28.6 (27.2-29.9)	27.2 (25.3-29.0)	57.6 (54.6-60.5)	14.7 (14.5-14.9)	32.6 (31.8-33.4)	22.7 (21.7-23.7)	63.4 (61.6-65.2)
40-64	37.2 (36.9-37.5)	39.5 (39.1-40.0)	61.8 (61.1-62.4)	43.7 (43.1-44.4)	40.2 (39.6-40.7)	44.5 (43.7-45.3)	70.0 (68.8-71.2)	44.6 (43.5-45.7)	35.4 (35.1-35.7)	36.6 (36.1-37.1)	56.0 (55.2-56.8)	43.0 (42.2-43.8)
≥65	54.3 (53.8-54.8)	51.3 (50.7-51.9)	77.1 (76.5-77.8)	44.4 (43.6-45.2)	60.1 (59.1-61.1)	59.8 (58.6-61.0)	83.9 (82.8-85.0)	45.8 (44.4-47.2)	50.4 (49.9-50.9)	45.7 (45.1-46.4)	71.7 (70.8-72.5)	43.3 (42.4-44.2)
Educational level												

https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2810984#:~:text=In%20India%2C%20nationally%2C%20more%20than,treated%20but%20with%20uncontrolled%20hypertension.

- The prevalence of hypertension was similar among the southern states (Kerala, Tamil Nadu, Karnataka, Telangana, and Andhra Pradesh), union territories (Andaman and Nicobar Islands, Lakshadweep, and Puducherry), and Goa compared with other parts of the country.

- median percentage of states: southern states, 29.9% [IQR, 29.1%-31.4%] vs rest of India, 26.8% [24.4%-32.0%]).

- A higher prevalence of hypertension was observed in urban vs rural areas for all states



THANK YOU

Pharmacological Principles of Anti-Hypertensive Drugs

Dr. Sana Rehman
Assistant Professor,
Department of Pharmacology, HIMSR

Hypertension:

- Hypertension is a hemodynamic disorder.
- A well accepted definition of hypertension was suggested by Evans and Rose: “Hypertension should be defined in the terms of blood pressure level above which investigation and treatment do good more than harm”

- hypertension is the principal cause of stroke; a major risk factor for CAD and its attendant complications, MI and sudden cardiac death; and a major contributor to heart failure, renal insufficiency, and dissecting aneurysm of the aorta.

The rule of halves of Hypertension:

For every 800 adults in the community:

400 are Hypertensive (Either high SBP or High DBP or both)

Of them, only 200 are diagnosed with hypertension

Of them, only 100 started treatment

Of them, only 50 are on correct drug therapy

Of them, only 25 attained the goal BP

Which means : 25/400= 6% have goal BP

TABLE 28–1 AMERICAN HEART ASSOCIATION CRITERIA FOR HYPERTENSION IN ADULTS

CLASSIFICATION	BLOOD PRESSURE (mmHg)	
	SYSTOLIC	DIASTOLIC
Normal	<120	and < 80
Prehypertension	120–139	or 80–89
Hypertension, stage 1	140–159	or 90–99
Hypertension, stage 2	≥160	or ≥ 100
Hypertensive crisis	>180	or > 110

Targets for the treatment of hypertension

BP =PERIPHERAL RESISTANCE X CARDIAC OUTPUT

CARDIAC OUTPUT = STROKE VOL. X H.R.

Thus B.P. can be reduced by:

(a) Dilating resistance vessels

(b) Reduce heart rate

(c) Reduce blood volume

Principles of Antihypertensive Therapy

- Non-pharmacological therapy, or lifestyle-related changes, is an important component of treatment of all patients with hypertension.
- In some grade 1 hypertensive, blood pressure may be adequately controlled by a combination of

➢ weight loss (in overweight individuals),

➢ restricting sodium intake (to 5–6 g/d),

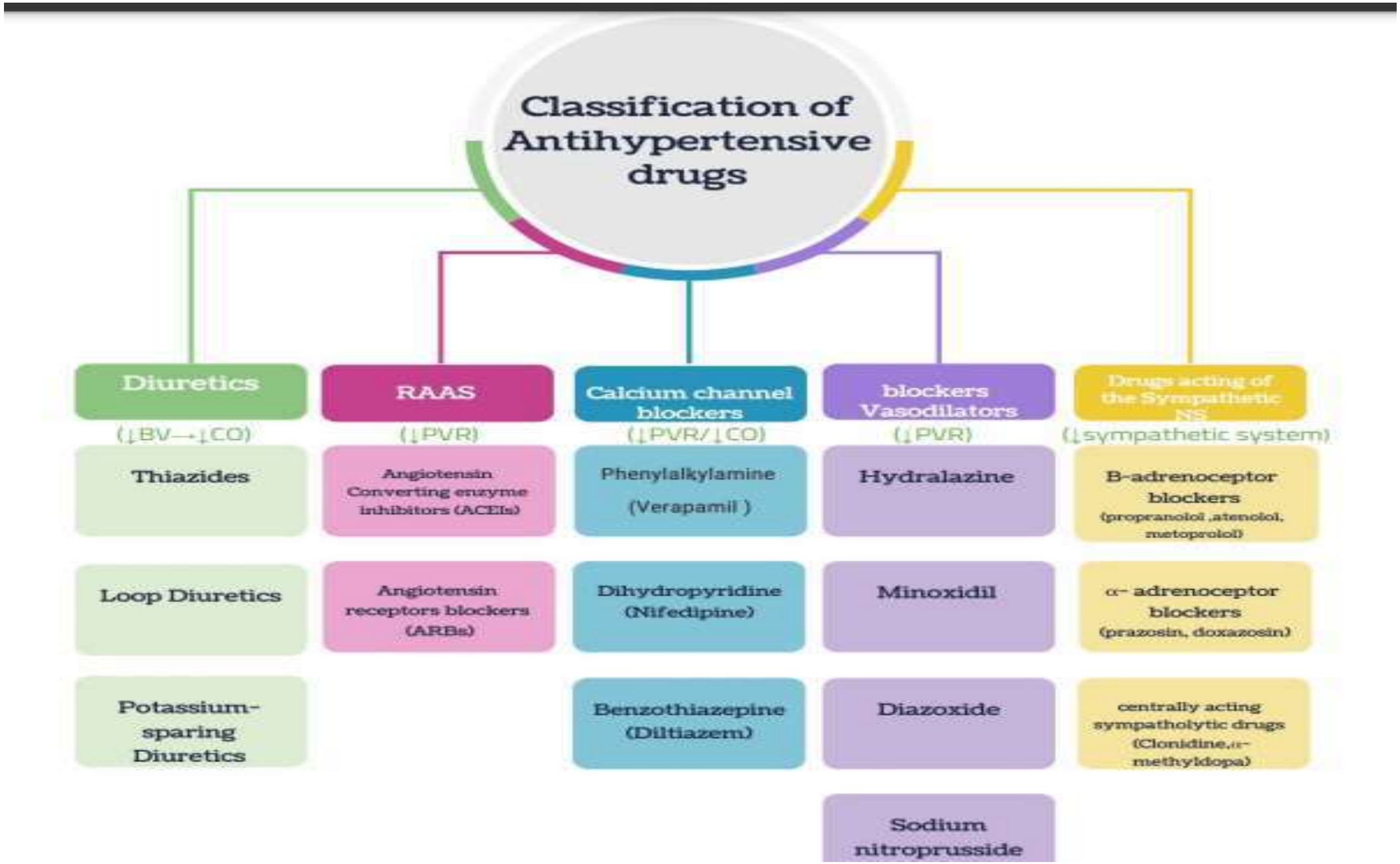
➢ increasing aerobic exercise (>30 min/d),

➢ moderating consumption of alcohol (ethanol/day ≤ 20–30 g in men [two drinks], ≤ 10–20 g in women [one drink]),

➢ smoking cessation,

➢ increased consumption of fruits, vegetables, and

➢ low-fat dairy products.


Classification of Antihypertensive drugs
Diuretics
(↓BV→↓CO)
Thiazides
Loop Diuretics
Potassium-sparing Diuretics
RAAS
(↓PVR)
Angiotensin Converting enzyme inhibitors (ACEIs)
Angiotensin receptors blockers (ARBs)
Calcium channel blockers
(↓PVR/↓CO)
Phenylalkylamine (Verapamil)
Dihydropyridine (Nifedipine)
Benzothiazepine (Diltiazem)
blockers Vasodilators
(↓PVR)
Hydralazine
Minoxidil
Diazoxide
Sodium nitroprusside
Drugs acting of the Sympathetic NS
(↓sympathetic system)
B-adrenoceptor blockers (propranolol ,atenolol, metoprolol)
α- adrenoceptor blockers (prazosin, doxazosin)
centrally acting sympatholytic drugs (Clonidine,α-methyldopa)

Classification of Antihypertensives

Renin-angiotensin antagonists :

1. *Angiotensin-converting enzyme inhibitors*: benazepril, captopril, enalapril, fosinopril, lisinopril, moexipril, perindopril, quinapril, ramipril, trandolapril

2. *AngII receptor blockers*: candesartan, eprosartan, irbesartan, losartan, olmesartan, telmisartan, valsartan

3. *Direct renin inhibitor*: aliskiren

Ca2+ channel blockers :

Amlodipine, clevidipine, diltiazem, felodipine, isradipine, lercanidipine, nicardipine, nifedipine,a nisoldipine, verapamil

Diuretics:

- *Thiazides and related agents*: chlorothiazide, chlorthalidone, hydrochlorothiazide , indapamide

- *Loop diuretics*: bumetanide, furosemide, torsemide
- *K+-sparing diuretics*: amiloride, triamterene, MRA spironolactone

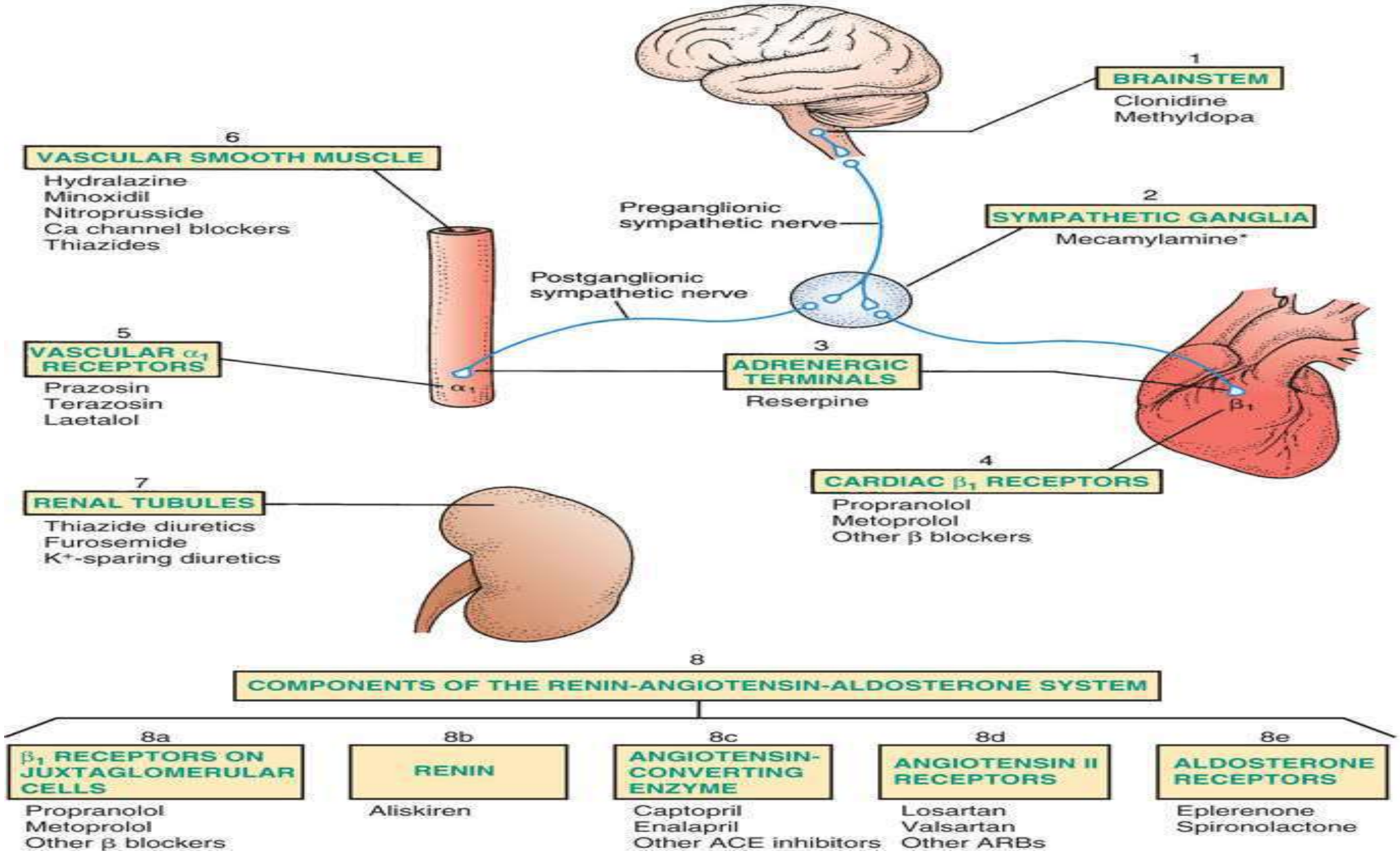
Sympatholytic drugs:

- β Blockers: atenolol, bisoprolol, esmolol, metoprolol, nadolol, nebivolol, propranolol, timolol
- α Blockers: prazosin, terazosin, doxazosin, phenoxybenzamine
- Mixed α/β blockers: labetalol, carvedilol
- Centrally acting sympatholytic agents: clonidine, guanabenz, guanfacine, methyldopa, moxonidine, reserpine

Vasodilators

- Arterial: Diazoxide, Fenoldopam, Hydralazine, minoxidil

- Arterial and venous: Nitroprusside



Site of actions antihypertensive drugs.

Antihypertensive Drug	Therapeutic Uses	Major Toxicity and Clinical Pearls
Diuretics		
Thiazide type Chlorothiazide Hydrochlorothiazide ***Thiazide-like*** Chlorthalidone Indapamide Metolazone	• Hypertension • Edema associated with HF, liver cirrhosis, chronic kidney disease, nephrotic syndrome • Nephrogenic diabetes insipidus • Kidney stones caused by Ca^{2+} crystals	• First choice for treating HTN • Chlorthalidone may be superior to hydrochlorothiazide in HTN • Lose efficacy at GFR < 30–40 mL/min (exceptions: indapamide, metolazone) • Potentiate effect of loop diuretics in HF (sequential tubular blockade) • Risk of hypokalemia and arrhythmia when combined with QT-prolonging drugs • Combine with ACEI/ARB or K+–sparing diuretic/MRA to prevent hypokalemia
Loop diuretics Bumetanide Furosemide Torsemide	• Acute pulmonary edema • Edema associated with HF, liver cirrhosis, chronic kidney disease, nephrotic syndrome • Hyponatremia • Hypercalcemia • Hypertension	• Not first choice for treating HTN with normal renal function: action too short and followed by rebound • Indicated acutely in malignant HTN and GFR < 30–40 mL/min • Torsemide may be superior to furosemide in HF • Risk of hypokalemia and arrhythmia when combined with QT-prolonging drugs
Sympatholytic Drugs		
β_1 Blockers Atenolol Bisoprolol Metoprolol Nebivolol Many others	• Hypertension • Heart failure (bisoprolol, metoprolol, nebivolol) • Widely used for other indications (angina, prevention of arrhythmias, rate control in atrial fibrillation, migraine, etc.)	• Role as first choice in the treatment of HTN debated; clear indication for angina, HF, atrial fibrillation, etc. • Bradycardia and AV block • Bronchospasm, peripheral vasoconstriction • Worsening of *acute* heart failure • Depression • Worsening of psoriasis • Polymorphic CYP2D6 metabolism (metoprolol) • Nebivolol NO-mediated vasodilation
Nonselective β blocker Propranolol	• Hypertension • Migraine	• Not first choice for treating HTN • Unwanted effects via blockade of β_2 receptors
α_1 Blockers Alfuzosin Doxazosin Prazosin Tamsulosin Silodosin	• Benign prostate hyperplasia • Hypertension	• Not first choice for treating HTN • Higher rate of HF development (?) • Tachyphylaxis • Phenoxybenzamine (irreversible α_1/α_2 blockade) used in pheochromocytoma
α_1 and β blockers Carvedilol Labetalol	• Hypertension • Heart failure (carvedilol)	• β blocker of choice in patients with peripheral artery disease • Among first choices for treating HF • Labetalol first choice for HTN in pregnancy

Antihypertensive Drug	Therapeutic Uses	Major Toxicity and Clinical Pearls
Sympatholytic Drugs		
Central sympatholytic drugs Methyldopa Clonidine/moxonidine Reserpine Guanfacine	- Hypertension	- Not first choice in treating HTN - Fatigue, depression - Nasal congestion
Ca^{2+} Channel Blockers		
Dihydropyridines Amlodipine, felodipine Nifedipine Clevidipine, isradipine Lercanidipine, nitrendipine ***Others*** Diltiazem, verapamil	- Hypertension - Angina - Rate control in atrial fibrillation (verapamil, diltiazem)	- Extended-release, long-acting dihydropyridines among first choice in HTN - Diltiazem and verapamil: only if effects on heart rate and AV conduction are wanted, not in combination with β blockers; beware CYP3A4-mediated drug interactions
Inhibitors of the Renin-Angiotensin System		
ACE inhibitors Benazepril Captopril Enalapril Lisinopril Quinapril Ramipril Moexipril Fosinopril Trandolapril Perindopril	- Hypertension - Heart failure - Diabetic nephropathy	- Among first choice for treating HTN - Short-acting captopril only for initiation of therapy; enalapril and ramipril twice daily - Cough in 5%–10% of patients, angioedema - Hypotension, hyperkalemia, skin rash, neutropenia, anemia, fetopathic syndrome - Contraindications: pregnancy, renal artery stenosis; caution in patients with impaired renal function or hypovolemia - Fosinopril: hepatic and renal elimination, thus eliminated in patients with HF and low renal perfusion
Angiotensin receptor blockers Candesartan Eprosartan Irbesartan Losartan Olmesartan Telmisartan Valsartan Azilsartan	- Hypertension - Heart failure - Diabetic nephropathy	- Same as ACEI, less cough or angioedema - No evidence for superiority over ACEI - In combination with ACEI, more harm than benefit - Contraindicated in pregnancy
Direct renin inhibitors Aliskiren	- Hypertension	- Therapeutic value unclear; no evidence for superiority over ACEIs or ARBs - Combination with RAS inhibitors contraindicated
Vasodilators		
Hydralazine	- Hypertension - Heart failure in African Americans (fixed combination with ISDN)	- Not first choice in treating HTN - Adverse effects: headache, nausea, flushing, hypotension, palpitations, tachycardia, dizziness, and angina pectoris; generally combined with β blocker to reduce baroreceptor reflex effects - Use cautiously in patients with CAD - Lupus syndrome at high doses
Minoxidil	- Hypertension - Alopecia	- Reserve antihypertensive in patients with renal insufficiency - Water retention, tachycardia, angina, pericardial effusion - Use in combination with diuretic, β blocker, and RAS inhibitor - Hypertrichosis
Sodium nitroprusside	- Hypertensive emergencies	- Only short-term intravenously - Adverse effect: hypotension - Cyanide intoxication


Thanks
you

MANAGEMENT OF HYPERTENSION

WORLD
HYPERTENSION
DAY MAY 17

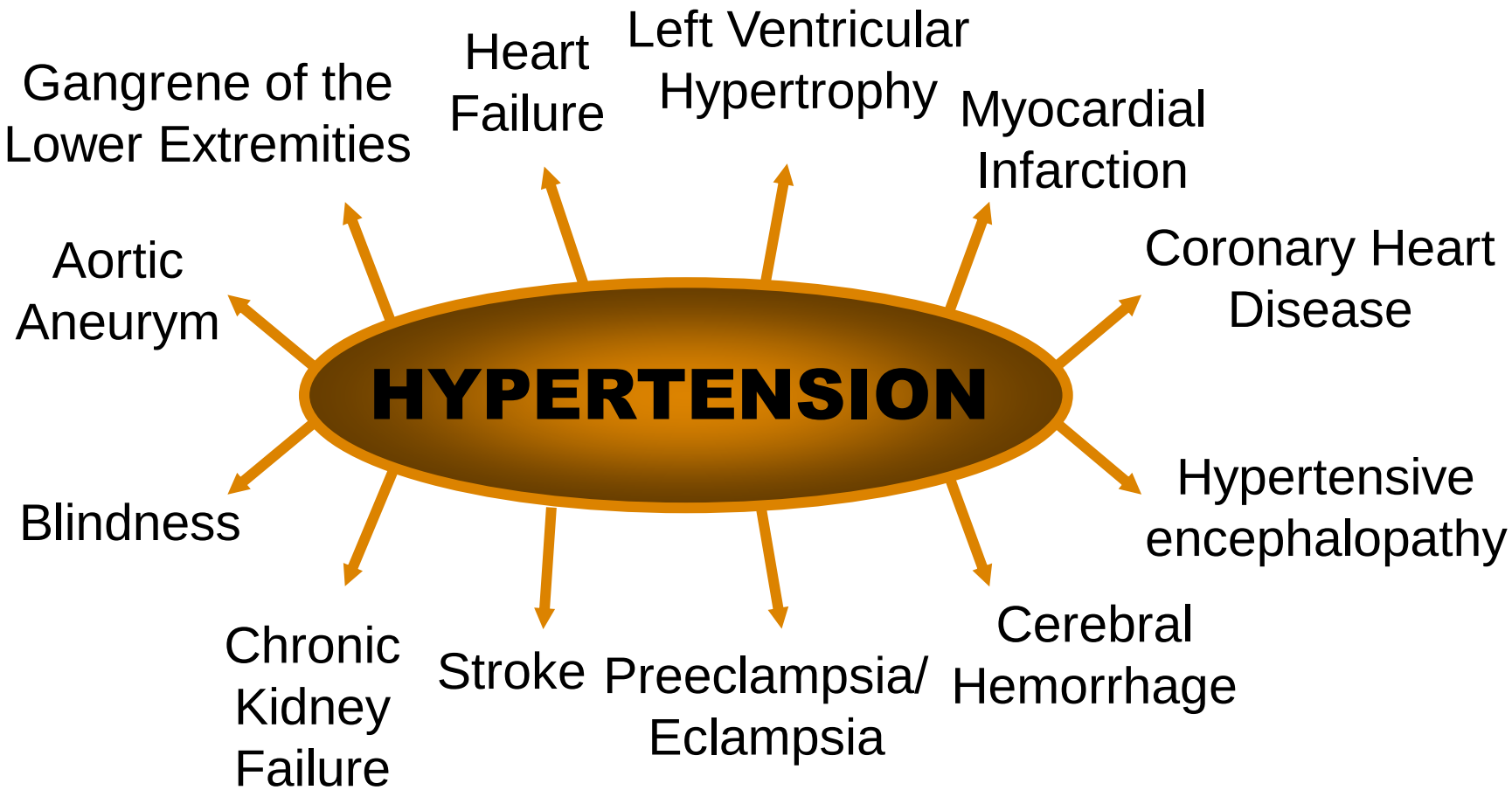
DR. DHARMANDER SINGH
ASSISTANT PROFESSOR
DEPARTMENT OF MEDICINE
HIMSR AND ASSOCIATED HAHC HOSPITAL

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)	and/or	DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

HYPERTENSION: PREDISPOSING FACTORS

- Advancing Age
- Sex (men and postmenopausal women)
- Family history of cardiovascular disease
- Sedentary life style & psycho-social stress
- Smoking ,High cholesterol diet, Low fruit consumption
- Obesity & wt. gain
- Co-existing disorders such as diabetes, and hyperlipidaemia
- High intake of alcohol

DISEASES ATTRIBUTABLE TO HYPERTENSION



TARGET ORGAN DAMAGE

- Heart
  - ✓ Left ventricular hypertrophy
  - ✓ Angina or myocardial infarction
  - ✓ Heart failure
- Brain
  - ✓ Stroke or transient ischemic attack
- Chronic kidney disease
- Peripheral arterial disease
- Retinopathy

CLINICAL MANIFESTATIONS

- No specific complains or manifestations other than elevated systolic and/or diastolic BP (***Silent Killer***)
- Morning occipital headache
- Dizziness
- Fatigue
- In severe hypertension, epistaxis or blurred vision

LABORATORY TESTS

- Routine Tests
  - Electrocardiogram
  - Urinalysis
  - Blood glucose,
  - Serum potassium, creatinine, or the corresponding estimated GFR, and calcium
  - Lipid profile, after 9- to 12-hour fast, that includes high-density and low-density lipoprotein cholesterol, and triglycerides
- Optional tests : Measurement of urinary albumin excretion or albumin/creatinine ratio
- More extensive testing for identifiable causes is not generally indicated unless BP control is not achieved

GOALS OF THERAPY

- Reduce Cardiac and renal morbidity and mortality.
- Treat to BP <140/90 mmHg or BP <130/80 mmHg in patients with diabetes or chronic kidney disease.

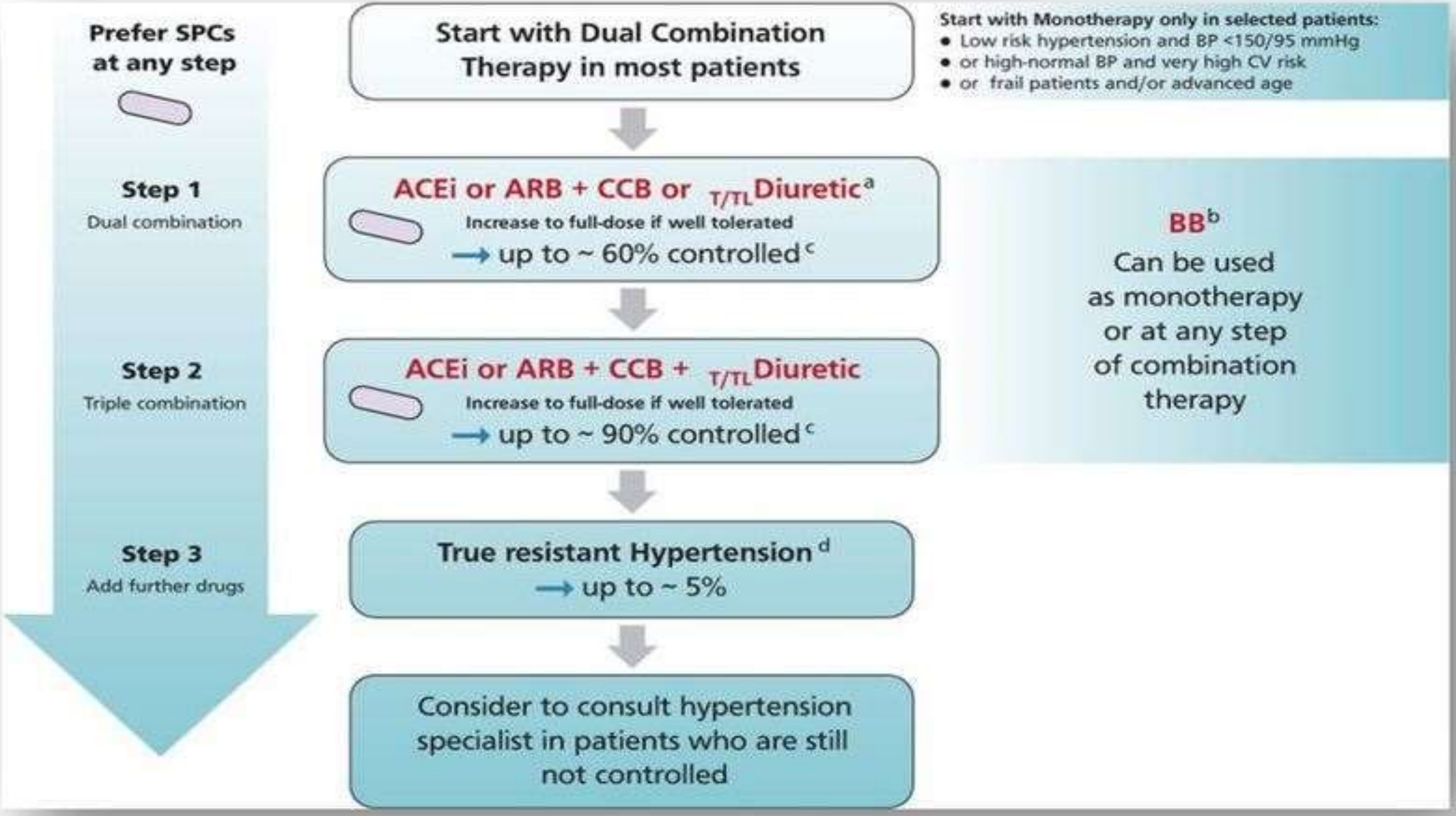
NON PHARMACOLOGICAL TREATMENT OF HYPERTENSION

LIFE STYLE MODIFICATIONS

- Lose weight, if overweight
- Increase physical activity
- Reduce salt intake
- Stop smoking
- Limit intake of foods rich in fats and cholesterol
- increase consumption of fruits and vegetables
- Limit alcohol intake

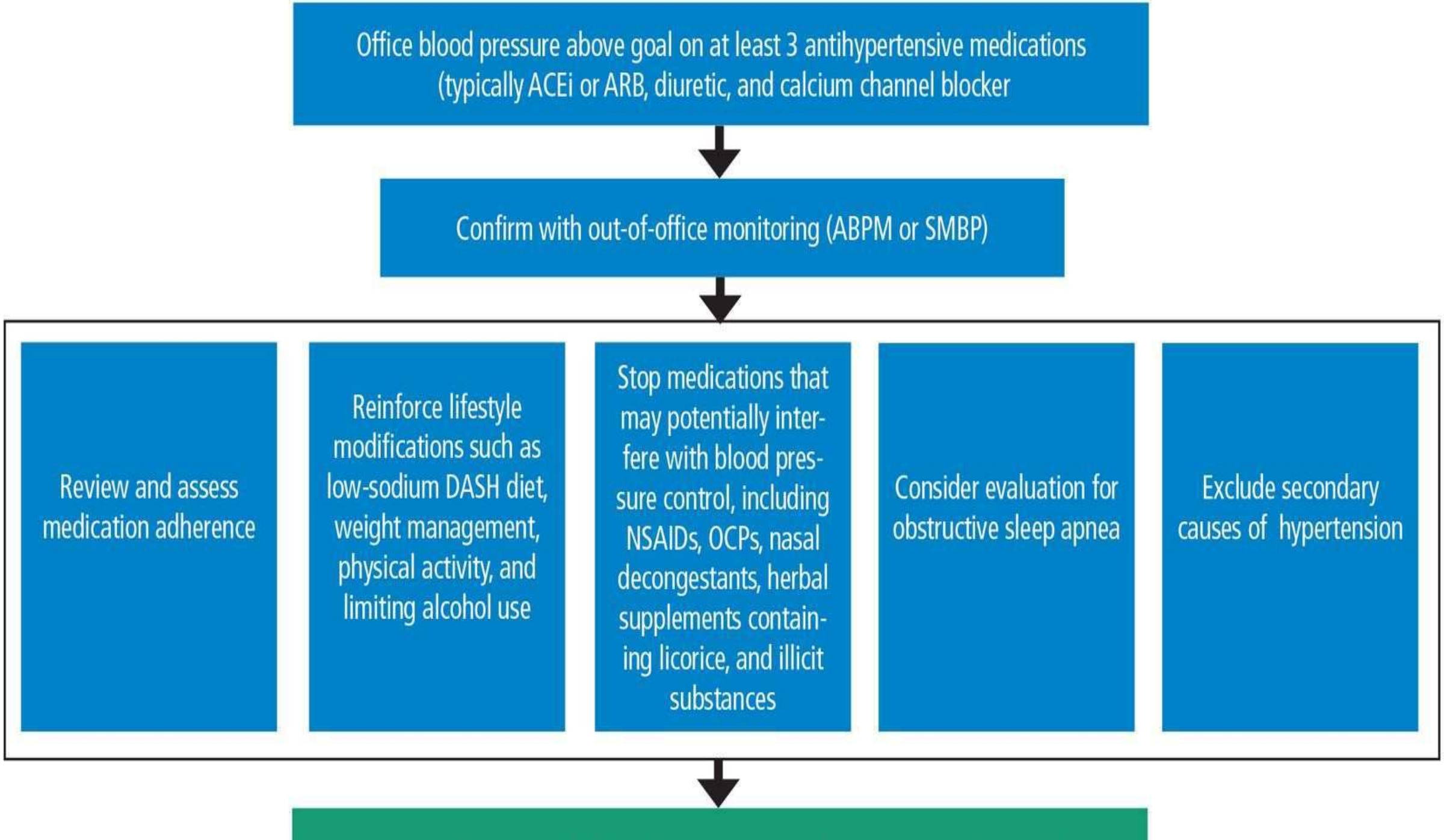
LIFESTYLE MODIFICATION EFFETS

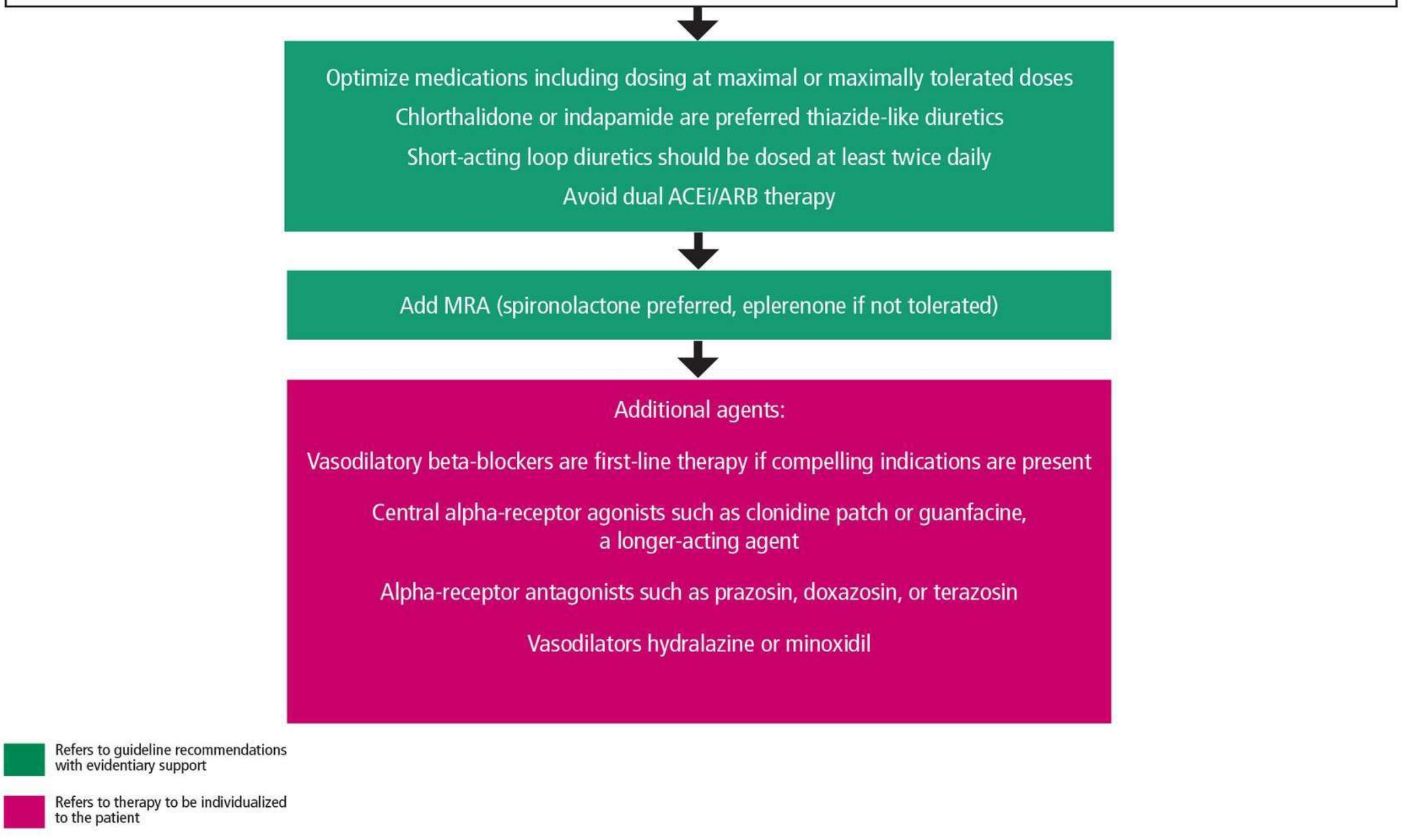
Modification	Approximate SBP reduction (range)
Weight reduction	5–20 mmHg / 10 kg weight loss
Adopt DASH eating plan	8–14 mmHg
Dietary sodium reduction	2–8 mmHg
Physical activity	4–9 mmHg
Moderation of alcohol consumption	2–4 mmHg


Prefer SPCs at any step
Start with Dual Combination Therapy in most patients
Start with Monotherapy only in selected patients:
• Low risk hypertension and BP <150/95 mmHg
• or high-normal BP and very high CV risk
• or frail patients and/or advanced age
Step 1
Dual combination
ACEi or ARB + CCB or T/TL Diuretic[a]
Increase to full-dose if well tolerated
→ up to ~ 60% controlled[c]
BB[b]
Can be used as monotherapy or at any step of combination therapy
Step 2
Triple combination
ACEi or ARB + CCB + T/TL Diuretic
Increase to full-dose if well tolerated
→ up to ~ 90% controlled[c]
Step 3
Add further drugs
True resistant Hypertension[d]
→ up to ~ 5%
Consider to consult hypertension specialist in patients who are still not controlled

RESISTANT HYPERTENSION

Resistant hypertension is defined as blood pressure that remains above 140/90 mmHg despite optimal use of three antihypertensive medications of different classes, including a diuretic.


Office blood pressure above goal on at least 3 antihypertensive medications (typically ACEi or ARB, diuretic, and calcium channel blocker
Confirm with out-of-office monitoring (ABPM or SMBP)
Review and assess medication adherence
Reinforce lifestyle modifications such as low-sodium DASH diet, weight management, physical activity, and limiting alcohol use
Stop medications that may potentially interfere with blood pressure control, including NSAIDs, OCPs, nasal decongestants, herbal supplements containing licorice, and illicit substances
Consider evaluation for obstructive sleep apnea
Exclude secondary causes of hypertension


Optimize medications including dosing at maximal or maximally tolerated doses
Chlorthalidone or indapamide are preferred thiazide-like diuretics
Short-acting loop diuretics should be dosed at least twice daily
Avoid dual ACEi/ARB therapy
Add MRA (spironolactone preferred, eplerenone if not tolerated)
Additional agents:
Vasodilatory beta-blockers are first-line therapy if compelling indications are present
Central alpha-receptor agonists such as clonidine patch or guanfacine, a longer-acting agent
Alpha-receptor antagonists such as prazosin, doxazosin, or terazosin
Vasodilators hydralazine or minoxidil
Refers to guideline recommendations with evidentiary support
Refers to therapy to be individualized to the patient

	Hypertensive emergency	Hypertensive urgency
Definition	Severe and acute elevation of blood pressure associated with new or worsening organ damage	Elevation of blood pressure without any clinical or laboratory evidence of acute organ damage
BP values	SBP>180 and or DBP>120	
Symptoms	Yes	No/minimal
Acute BP increase	Yes	Yes
Acute organ damage	Yes	No
Bp reduction rate	Minutes to hours	Hours to days

TARGET ORAGN DAMGE PRESENT	NO ORGAN DAMAGE
HYPERTNSION EMERGENCY	URGENCY
DECREASE ~25% OF BP WITHIN FIRST HOUR	REDUCE ~ 25% BP OVER NEXT 24 HOURS SLOWLY
IN NEXT 2-4 HOURS REDUCE BP TO SBP 160 AND DBP 110-100	MAINTAIN BP OF SBP 160 AND DBP 110-100 IN NEXT DAYS
MAINTAIN SAME OVER NEXT 24 HOURS	NORMALISE BP OVER A MONTH
REDUCE TO NORMAL LEVEL ON OPD BASIS	

Future Directions and Innovations

1

Digital Health Solutions

Technological advancements in remote monitoring, telemedicine, and wearable devices offer new avenues for personalized hypertension management.

2

Precision Medicine

Tailoring treatment strategies based on genetic markers, biomarkers, and individual characteristics holds promise for optimizing hypertension care.

3

Population Health Initiatives

Community-based interventions, public awareness campaigns, and policy changes play a crucial role in addressing the hypertension epidemic at a population level.

THANK YOU

Prevention of Hypertension

Dr Yasir Alvi

There are a number of things we can do to prevent hypertension

Lifestyle modification

Non-Pharmacologica

5-20mm SBP

Maintaining a healthy weight

Getting regular exercise

Quitting smoking

10-15mm SBP

Eating a healthy diet

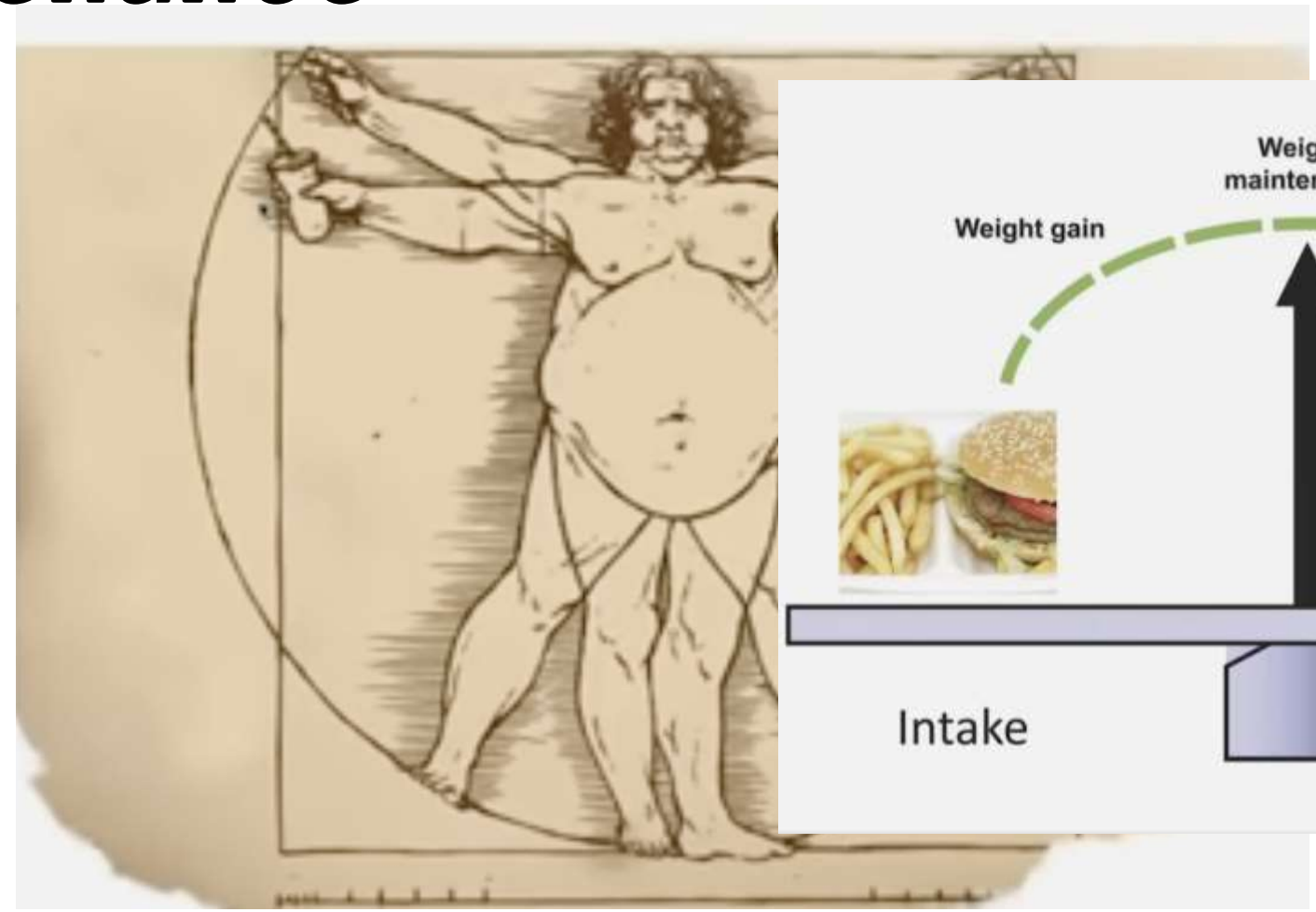
Managing stress

Limiting alcohol

DASH – Dietary approach to stop HTN

- Reducing Saturated and Trans fats
- Reducing sugars
- Limit your sodium intake. < 2.3g/d --- 1 teaspoon of table salt
- Reduce caffeine intake

Weight reduction and maintenance



Tips for Maintaining a Healthy Weight

Portion control

- Don't eat until you are full but rather until you are no longer hungry
- Don't deprive yourself but rather limit yourself

Eat several small meals rather than overeating at one meal

- Use a small plate and eat slowly

Shop for healthy foods

- Remove all unhealthy foods from the house
- Be mindful and enjoy the meal

Increase your physical activity

- Use your smart phone to track your steps
- Increase your requirement to walk (aim to walk at least 150 minutes a week)

Monitor your alcohol intake

- Increase water intake instead – practice moderation

Eat high protein foods and decrease carbs

- Don't eat in hiding, in bed, or in front of the T.V., and don't eat out of a container or packaging

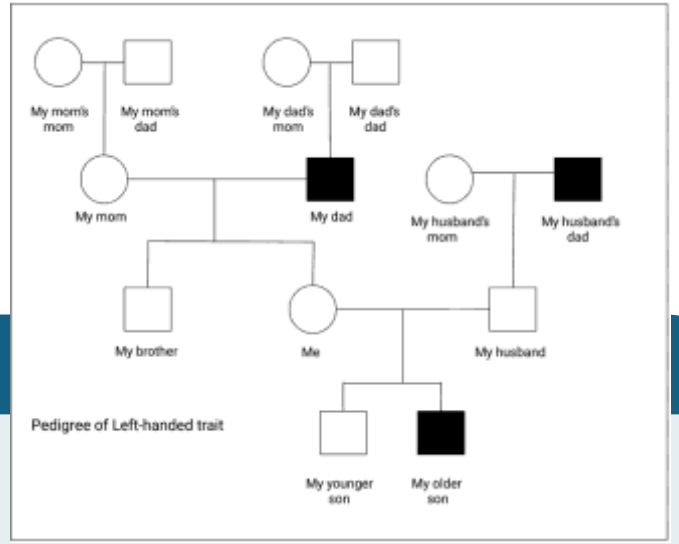
Eating to cope with psychological states

- Feeling anxious
- Feeling stressed
- Depression
- Deprivation
- Anger
- Boredom

- We engage in mindless eating
- We escape from self-awareness
- We tend to convince ourselves we deserve this “treat”
- We avoid thinking about what is truly bothering us

Be mindful of

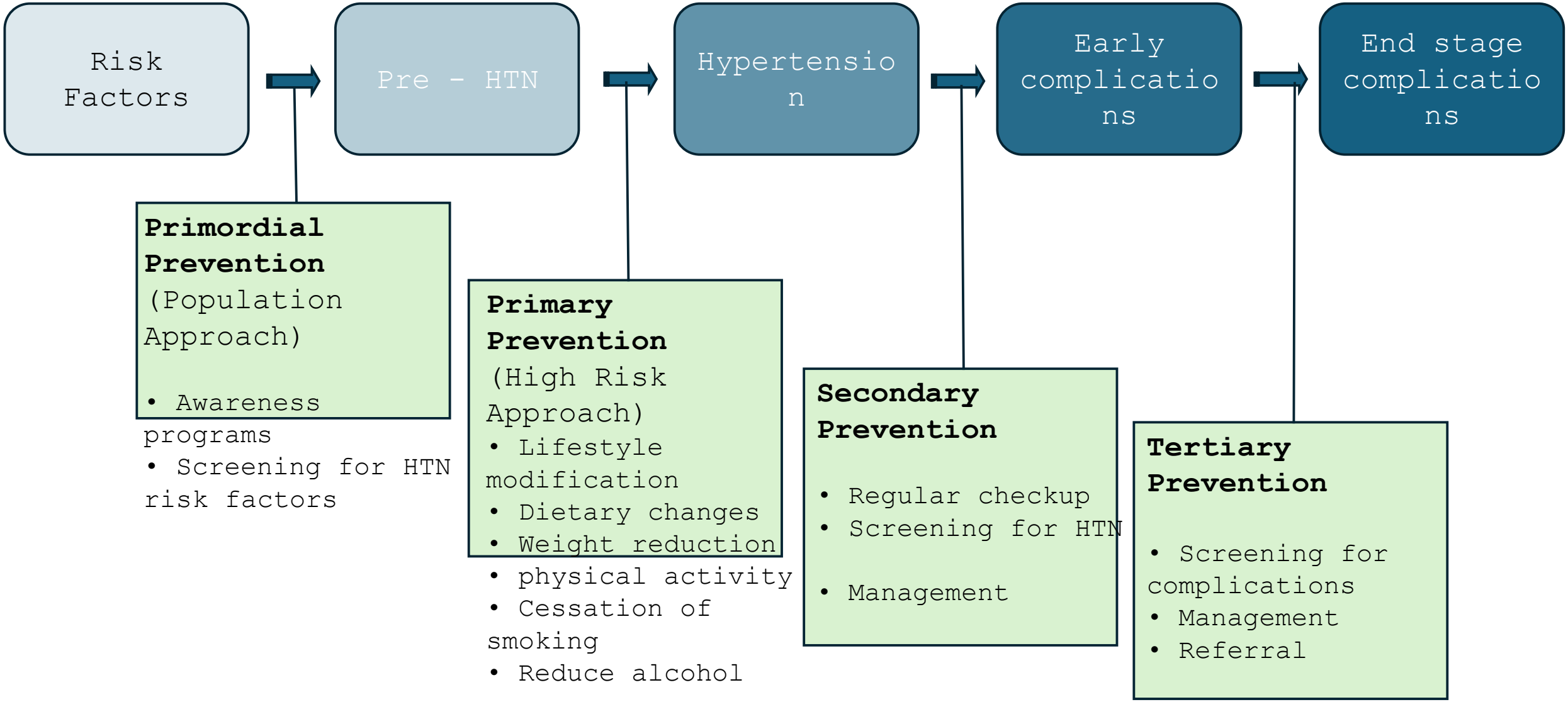
Get regular check up.



Family history of risk factors.

Risk factors

- Modifiable
  - ❖Excess dietary sodium
  - ❖Obesity
  - ❖Sedentary lifestyle
  - ❖Stress
  - ❖Alcohol
  - ❖Cigarette smoking
  - ❖Diabetes mellitus
  - ❖Elevated serum lipids
  - ❖Socioeconomic status
- Non-modifiable Risk
  - ❖Gender
  - ❖Age
  - ❖Family history
  - ❖ Ethnicity


Risk Factors
Pre - HTN
Hypertension
Early complications
End stage complications
Primordial Prevention (Population Approach)
• Awareness programs
• Screening for HTN risk factors
Primary Prevention (High Risk Approach)
• Lifestyle modification
• Dietary changes
• Weight reduction
• physical activity
• Cessation of smoking
• Reduce alcohol
Secondary Prevention
• Regular checkup
• Screening for HTN
• Management
Tertiary Prevention
• Screening for complications
• Management
• Referral

Risk calculators

From the Strong Heart Study

Calculator: Estimated Risk of Developing Hypertension in the next 4 Years

The risk calculator below uses research data from the Strong Heart Study (Citation: Wang et al. Hypertension. 2006;47:403-409) to estimate the risk for a non-hypertensive person to develop hypertension in the next 4 years. It is **designed for American Indians of age 35 and older**. This calculator is not intended for clinicians but rather serves as a tool for research and community planning. To find your estimated risk, enter your information in the calculator below. Definitions and descriptions of some terms in the calculator are provided at the bottom of the calculator.

Predicting risk of developing incident hypertension in the next 4 years for a person who does not currently have hypertension.	(●) Hypertension
Age (year)	35
Weight (lb)	190
Height (in)	71
Systolic blood pressure (SBP) (mmHg)	122
Diastolic blood pressure (DBP) (mmHg)	80
Do you currently drink more than two (if male) or one (if female) serving of alcohol per day?	(●) No ( ) Yes
Do you have any parents who had hypertension?	( ) No (●) Yes
Are you currently on diabetes medications?	(●) No ( ) Yes
Fasting plasma glucose (FPG) (mg/dL)	90
Do you have micro-albuminuria?	(●) No ( ) Yes
Do you have macro-albuminuria?	(●) No ( ) Yes

Reset

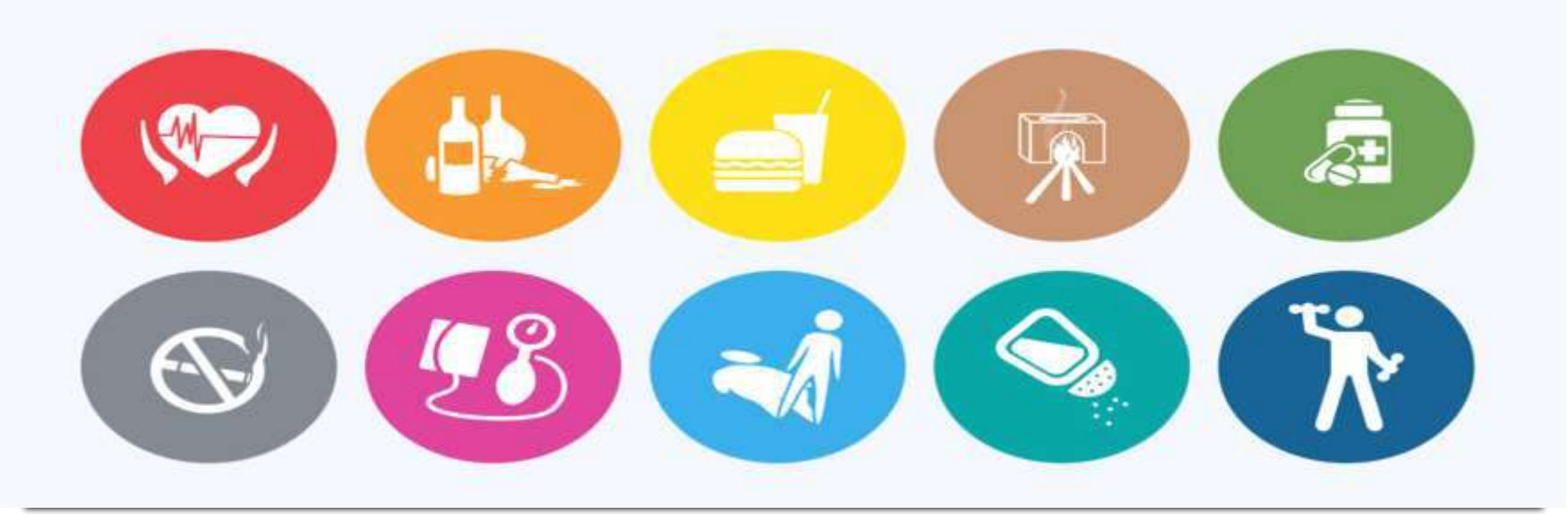
Calculate Your Risk

Your Estimated Risk: 9.83 %

Center for American Indian Health Research, Hudson College of Public Health

National Programme for Prevention and Control of Non-Communicable Diseases

- Renamed in 2023



Strategies

- **Health promotion**
- **Opportunistic Screening**, early diagnosis, management, referral and follow up
- **Capacity building**
- Evidence based **standard treatment protocols**
- Uninterrupted **drug and logistics supply**
- people-centered care
- **Health Information system**
- Monitoring, supervision, evaluation and surveillance, technology
- Multi-sectoral **coordination**

Thank you