



The Lebanese Order of Pharmacists
26th Annual Congress

Teaming Up for Excellence in Patient Care
معاً للتميز في رعاية المريض

Controlling the Silent Killer: New Hypertension Guidelines

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November 16-18, 2018. Hilton Habtoor Grand. Beirut - Lebanon



Disclosure

“Faraj K. Saade” declares to meeting attendees that there are no financial relationships with any for-profit companies that are directly or indirectly related to the subject of this presentation



Learning Objectives

- Review basic concepts related to hypertension (HTN)
- Understand the new treatment recommendations included in the new ACC-AHA 2017 HTN guideline
- Devise evidence-based treatment plans for managing hypertension
- Discuss the different medications used

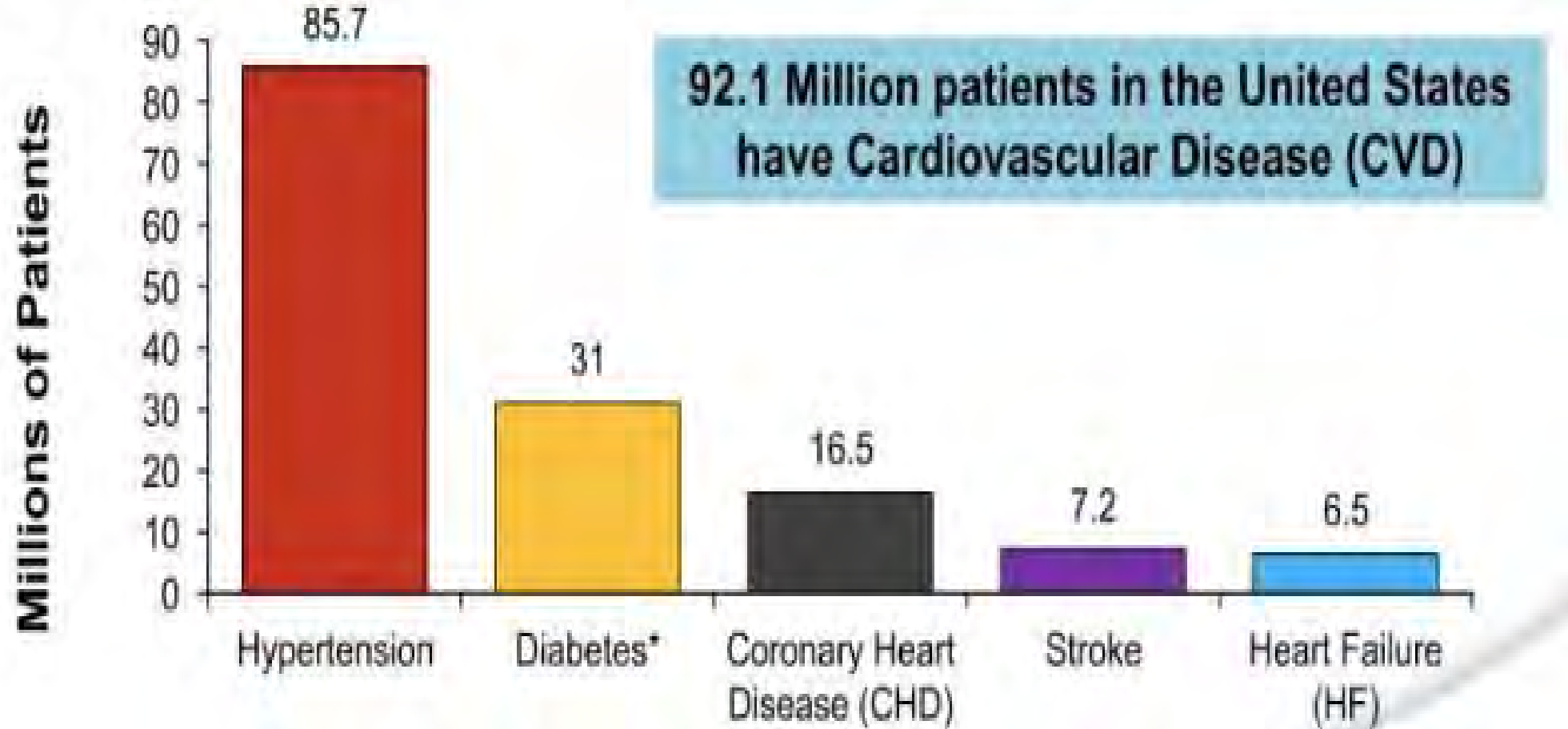


Impact of Hypertension

- Leading risk factor for cardiovascular diseases (CVD) and mortality worldwide
- Over 1 billion individuals in the world!
- Over 7 million deaths per year
- Over 1/3 of the Lebanese population
- 75% of the Lebanese aged >65 years have hypertension
- Around 50% of hypertensive Lebanese patients are receiving medical therapy
- 54% have controlled hypertension on therapy



American Heart Association Heart Disease & Stroke Statistics – 2017 Update

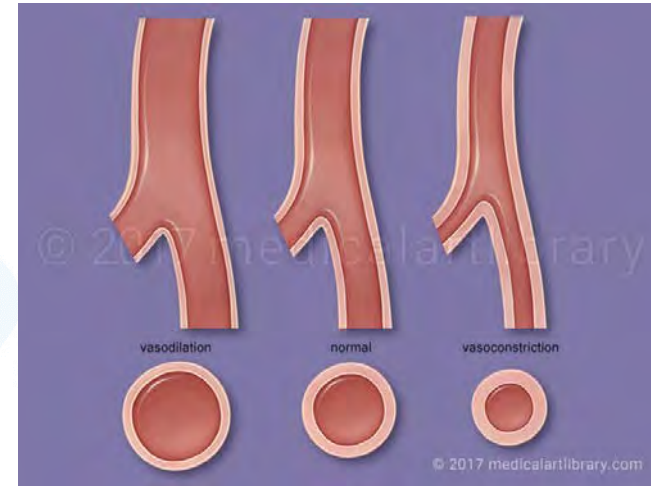
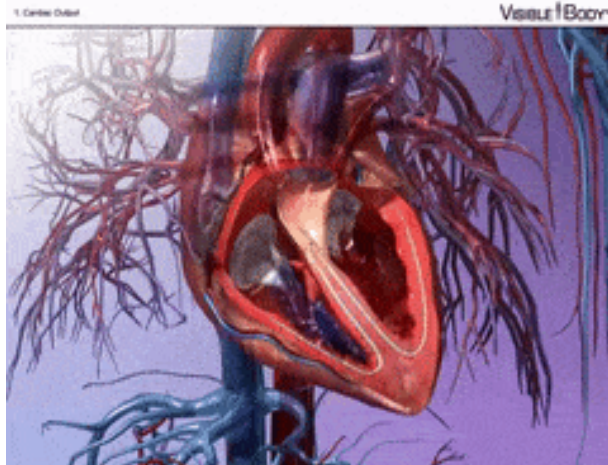


* Includes diagnosed & undiagnosed patients



Blood Pressure Definition

- $BP = CO \text{ (cardiac output)} \times PVR \text{ (peripheral vascular resistance)}$

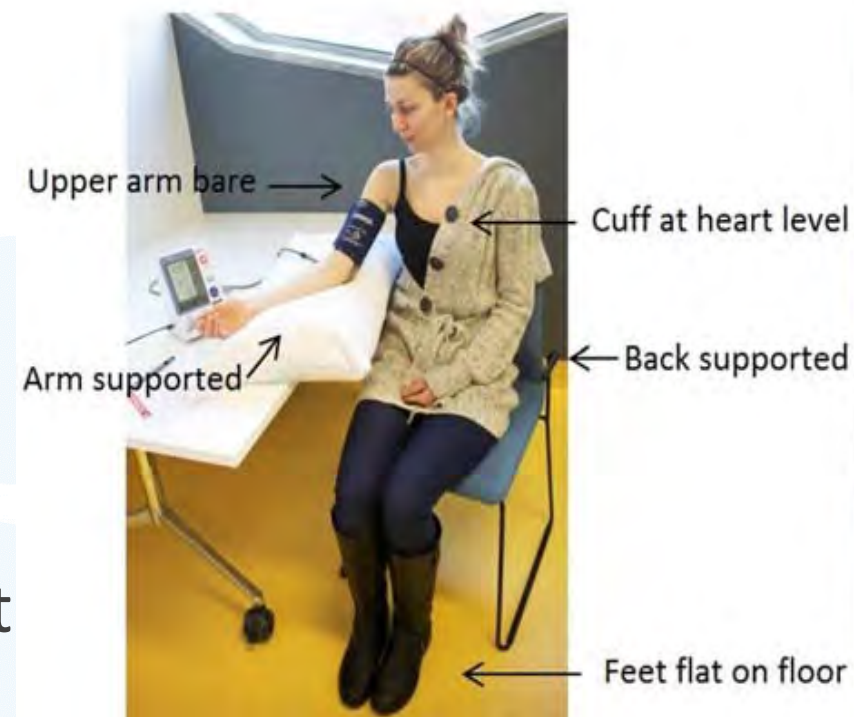


- Arterial blood pressure is necessary for organ perfusion
- Sympathetic Nervous System (SNS), Renin Angiotensin Aldosterone System (RAAS), and plasma volume affect the blood pressure



BP Measurement

- Right machine
- Well seated
- 5 minutes of rest
- No conversation
- Arm at heart level
- Avoid tobacco/caffeine before BP measurement
- Two seated readings
- Major role in ambulatory BP measurement





BP Elevation

1° (Essential) HTN

- Age
- Obesity
- Family History
- Race
- High Sodium diet >3g
- Reduced nephron #
- Alcohol Consumption
- Physical Inactivity

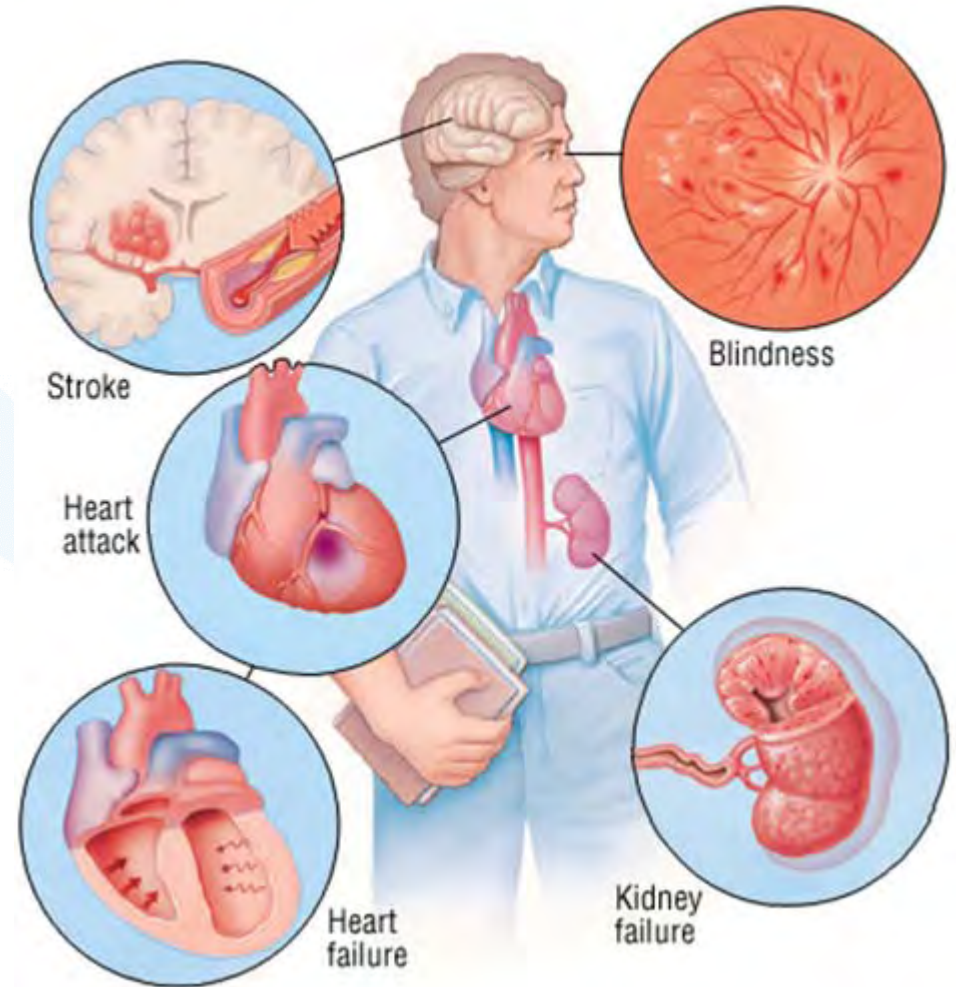
2° HTN

- Primary aldosteronism
- Obstructive sleep apnea
- Pheochromocytoma
- Cushing's syndrome
- Coarctation of the aorta
- Hyperthyroidism /
Hyperparathyroidism
- Illicit drug use



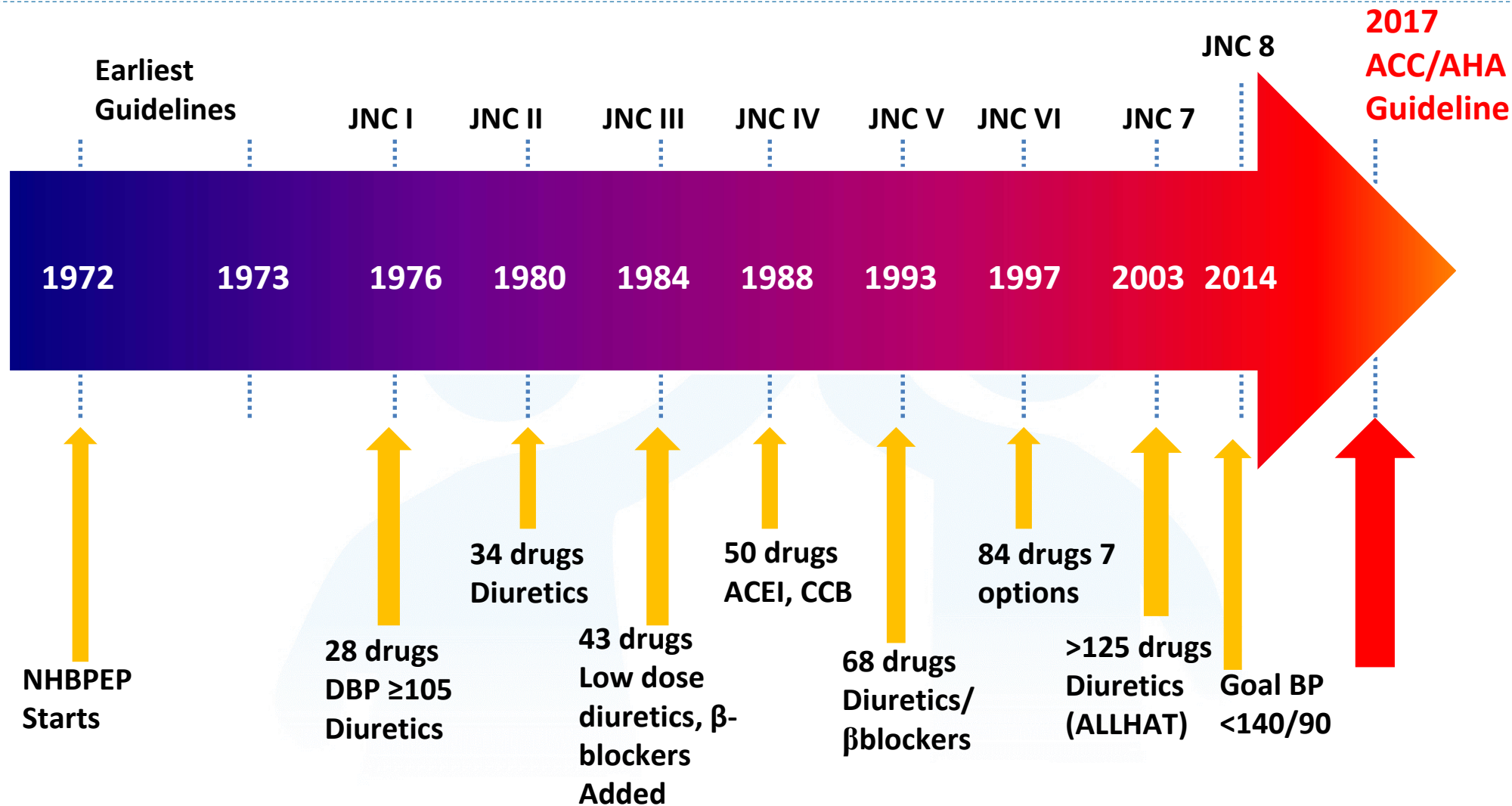
Complications of High BP

- Heart failure (HF)
- Myocardial infarction (MI)
- Ischemic stroke
- Intracerebral hemorrhage
- Renal dysfunction
- Ocular problems
- Cognitive decline?!





Guideline Development



2017

ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines





BP Categories in Adults

BP* Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	or	80–89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

*BP indicates blood pressure (based on average of ≥ 2 careful readings obtained on ≥2 occasions)

Note: Individuals with SBP and DBP in 2 categories should be designated to the higher BP category



BP Thresholds and BP Goals for Patients with HTN

Clinical Condition	BP Threshold mm Hg*	BP Goal mm Hg
General		
Clinical CVD or 10-year ASCVD Risk \geq 10%	\geq 130/80	$<$ 130/80
No clinical CVD and 10-year ASCVD Risk $<$ 10%	\geq 140/90	$<$ 130/80
Older persons ($>$ 65 year of age; non-institutionalized, ambulatory, community living adults)	\geq 130/80 (SBP)	$<$ 130/80 (SBP)

* BP lowering medication is recommended at this threshold



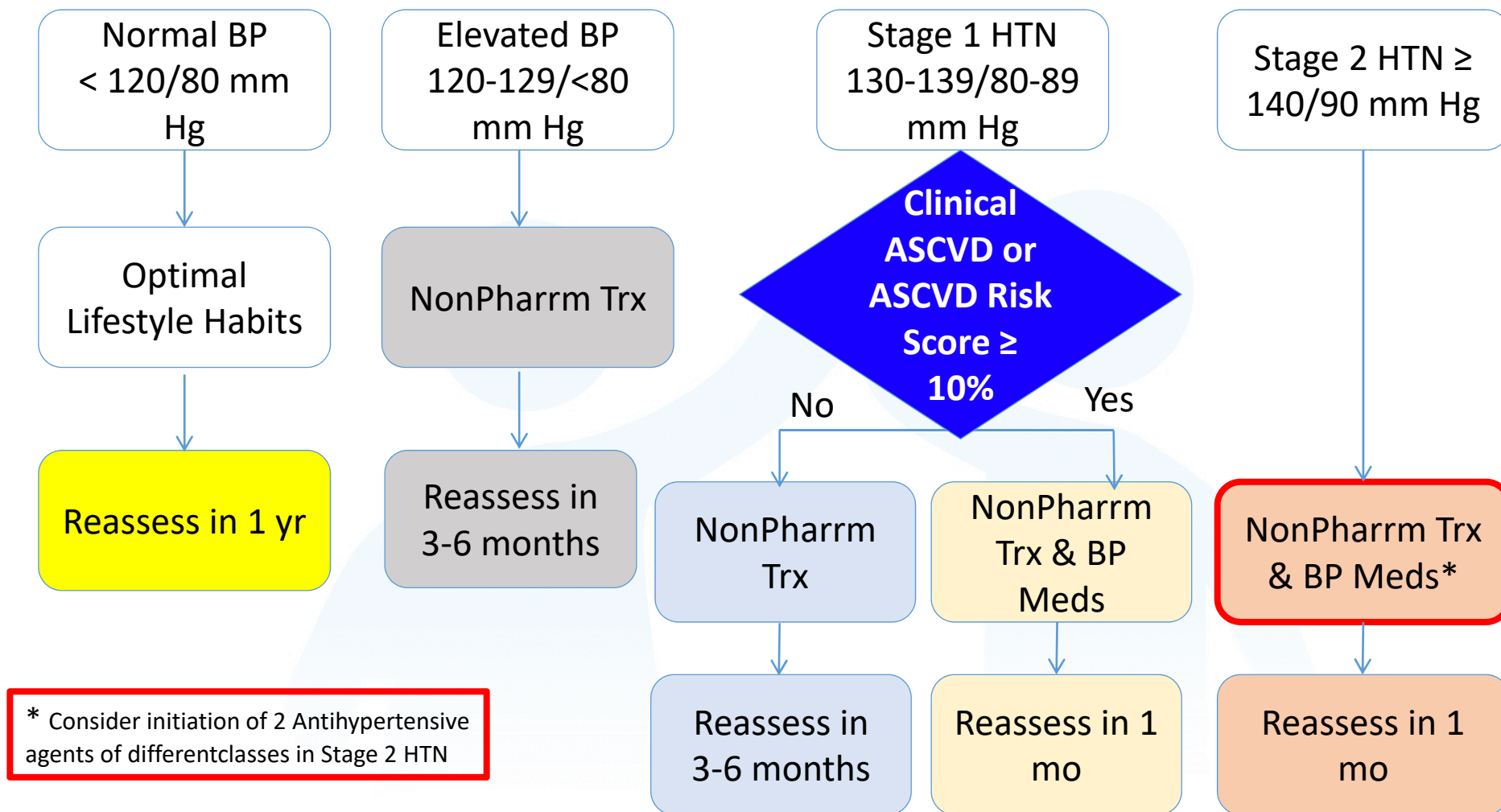
BP Thresholds and BP Goals for Patients with HTN

Clinical Condition	BP Threshold mm Hg*	BP Goal mm Hg
DM	$\geq 130/80$	$< 130/80$
CKD	$\geq 130/80$	$< 130/80$
CKD post renal transplant	$\geq 130/80$	$< 130/80$
HF	$\geq 130/80$	$< 130/80$
Stable ischemic heart disease	$\geq 130/80$	$< 130/80$
Secondary stroke prevention	$\geq 140/90$	$< 130/80$
Secondary stroke prevention (lacunar)	$\geq 130/80$	$< 130/80$
PAD	$\geq 130/80$	$< 130/80$

* BP lowering medication is recommended at this threshold



2017 ACC/AHA HTN Treatment Algorithm





Non-pharmacologic Approaches

Weight loss	Weight loss in overweight or obese
Heart-healthy diet	DASH (Dietary Approaches to Stop Hypertension) diet to facilitate achieving a desirable weight
Sodium reduction	Sodium reduction
Potassium supplementation	Potassium supplementation, preferably in dietary modification, unless contraindicated due to CKD or use of drugs that reduce potassium excretion
Increased physical activity	Structured exercise program
Limit Alcohol intake	Limit alcohol to no more than 2 standard drinks per day for men and 1 standard drink per day for women



Antihypertensive Therapy Recommendations

Without Compelling Indications / Special Cases

First-line agents

ACEI, ARB, CCB and/or thiazide

Stage 1 (BP \geq 130/80 mm Hg)

- Antihypertensive monotherapy

**Stage 2 (BP \geq 140/90 mm Hg
and average BP $>$ 20/10 mm Hg
above goal)**

- Start with antihypertensive combination therapy
- As separate medications or fixed dose combinations

**Special population based
recommendations**

- Black \rightarrow CCB or thiazide-type diuretic
- Pregnancy \rightarrow methyldopa, nifedipine, and/or labetalol

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Antihypertensive Therapy

Recommendations: Compelling Indications

Clinical Condition	1 st line Drug
Diabetes mellitus (DM)	Thiazide, CCB, ACEi, or ARB
DM with Albuminuria	ACEi or ARB
CKD (Stage 3 or higher or stage 1 or 2 with albuminuria)	ACEi or ARB
Heart Failure (HF) with reduced EF	Beta Blocker, ACEi, or ARB, ARA
HF with preserved EF	Beta Blocker, ACEi, or ARB
Stable ischemic heart disease	Beta Blocker, ACEi, or ARB
Stable ischemic heart disease with <u>angina</u>	Beta Blocker, CCB
Secondary <u>stroke</u> prevention	Thiazide, ACEi, or ARB



Resistant HTN

Confirm Treatment Resistance

- Office BP \geq 130/80 mm Hg
- **AND**
- Patient prescribed \geq 3 BP medications at optimal doses including a diuretic if possible **OR** Office BP $<$ 130/80 mm Hg receiving $>$ 4 BP medications

Exclude Pseudoresistance

- **Ensure accurate office BP measurement**
- Assess for non-adherence to BP medications
- Obtain home or **ambulatory** BP readings

Treatment approaches

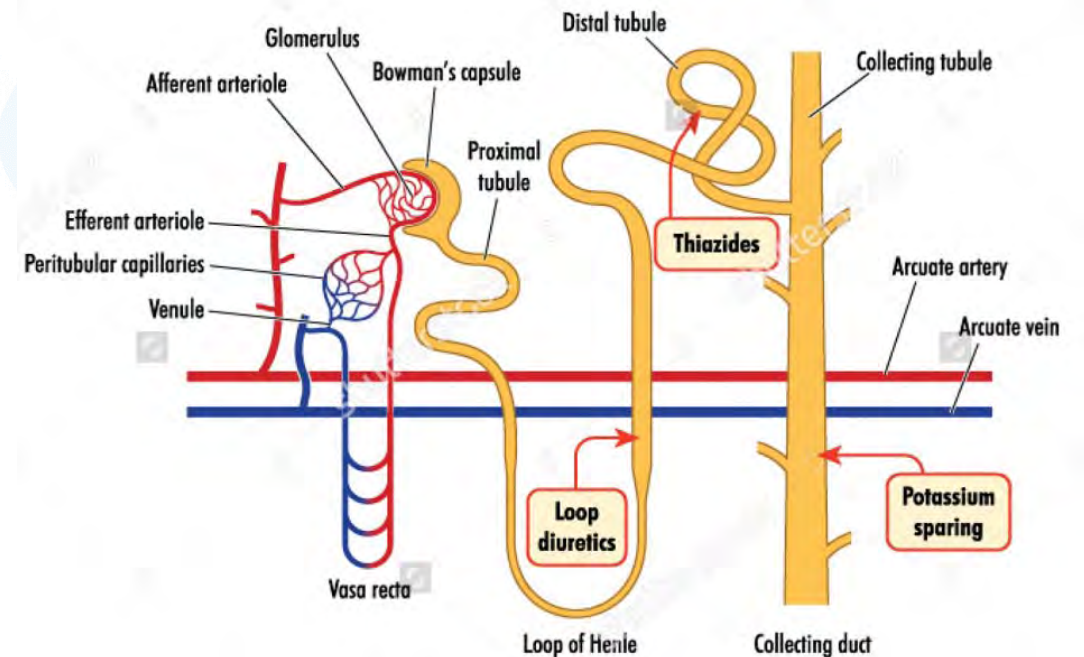
- Maximize **diuretic** therapy
- **Add a mineralocorticoid receptor antagonist (eg: spironolactone)**
- Add other BP medications with different mechanism of action
- Use a loop diuretic in patients with CKD or receiving potent vasodilator



Medication Remarks

■ THIAZIDES:

- **Chlorthalidone/Indapamide** might be superior (thiazide like diuretics)
- Avoid when CrCl < 30 mL/min (Loops)
- Hyperuricemia and gout !
- Monitor the electrolytes
- Prescribe low to moderate doses
- Positive effect in osteoporosis, & obese
- Doses:
 - Hydrochlorothiazide 12.5-25 mg
 - Chlorthalidone 12.5-25 mg
 - Indapamide 1.25-2.5 mg

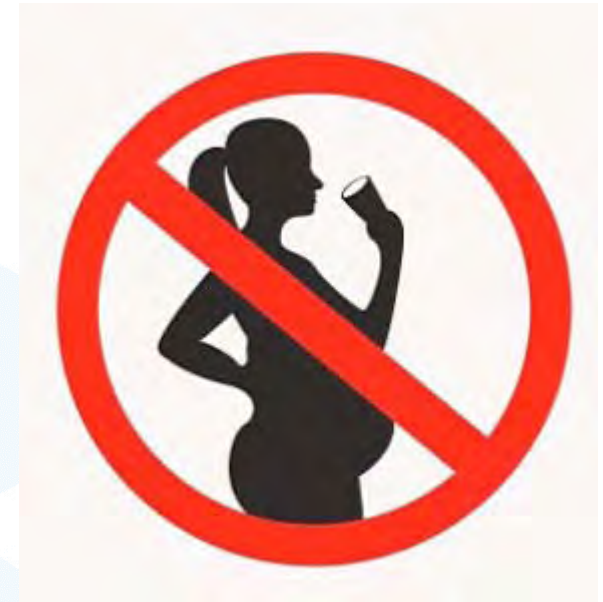




Medication Remarks

■ ACE inhibitors / ARBs:

- Start with a low dose
- Dry cough, angioedema
- Avoid in pregnancy
- Monitor creatinine, and potassium
- Avoid in bilateral renal artery stenosis
- Never to be prescribed together
- Good choice in young patients
- Bed time dosing ?





ACE Inh / ARB DOSES

GENERIC ACE I	DOSE RANGE	GENERIC ARB	DOSE RANGE
Captopril	12.5-50 mg bid/tid	Losartan	25-100 mg
Lisinopril	10-40 mg	Candesartan	8-32 mg
Perindopril	4-16 mg	Valsartan	80-320 mg
Ramipril	2.5-10 (20) mg	Irbesartan	150-300 mg
Quinapril	10-80 mg	Telmisartan	40-80 mg
Trandolapril	2-8 mg	Olmesartan	20-40 mg
Enalapril	10-40 mg	Eprosartan	400-800 mg



Medication Remarks

■ CCBs:

- **Amlodipine** (Dihydropyridine: **DHP**) lacks negative inotropic/chronotropic effects
- **Verapamil** and **diltiazem** (**non-DHP**) have significant negative inotropic/chronotropic effects
- Non-DHPs have many drug interactions
- Pedal edema is a common side effect
- **Commonly used drugs**: Amlodipine/Felodipine (2.5-10 mg), Lercanidipine (10-20 mg) Nifedipine XL (30-90 mg), Diltiazem XL (120-180 mg bid), Verapamil SR (120-480 mg)





Medication Remarks

- **Mineralocorticoid Receptor Antagonist:**
 - **Spironolactone & Eplerenone**
 - Preferred in primary aldosteronism and resistant hypertension
 - Spironolactone → more gynecomastia and impotence than eplerenone
 - Avoid use with K⁺ supplements, and in patients with significant renal dysfunction
 - Eplerenone → given bid to decrease BP

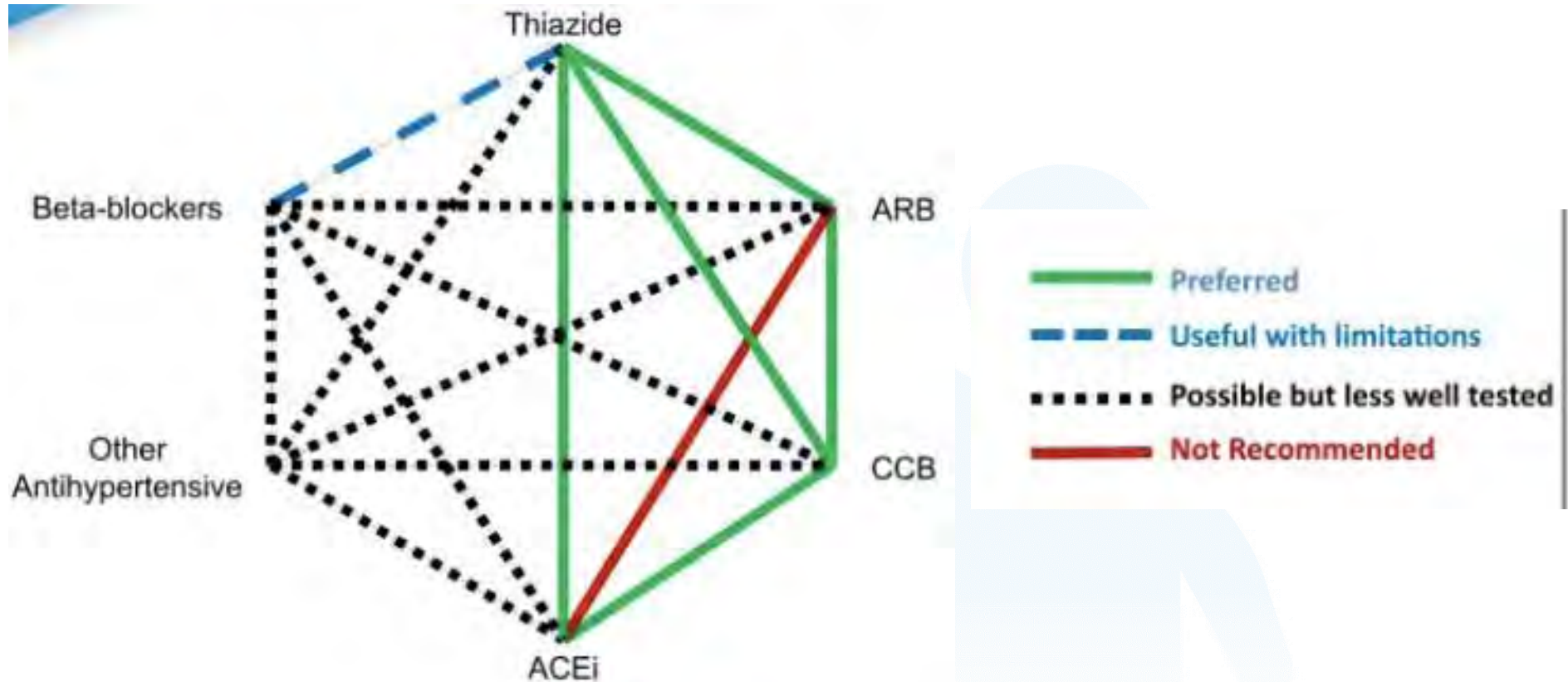


Medication Remarks

Common Fixed Dose Combinations				
ACEi + Thiazide	ARB + Thiazide	ACEi + CCB	ARB + CCB	ARB + CCB + Thiazide
Captopril + HCTZ	Losartan + HCTZ	Enalapril + Lercanidipine	Valsartan + Amlodipine	Losartan + Amlodipine + HCTZ
Enalapril + HCTZ	Valsartan + HCTZ	Perindopril + Amlodipine	Olmesartan + Amlodipine	Valsartan + Amlodipine + HCTZ
Lisinopril + HCTZ	Irbesartan + HCTZ	Enalapril + Nitrendipine	Telmisartan + Amlodipine	Olmesartan + Amlodipine + HCTZ
Perindopril + Indapamide	Candesartan + HCTZ		Irbesartan + Amlodipine	
Ramipril + HCTZ	Telmisartan + HCTZ		Losartan + Amlodipine	
Quinapril + HCTZ	Olmesartan + HCTZ			
Zofenopril + HCTZ				



Combination Therapy





Key Takeaways

1. < 130/80 mm Hg is the new BP goal for nearly all patients
2. Healthy lifestyle interventions are the cornerstone of therapy
3. First-line medications are an ACEi, ARB, CCB or thiazide like
4. Combination antihypertensive therapy is needed for most patients
5. Pharmacists have an important role in the management of HTN



Case Scenario 1: Lara

- Lara is a 47-year-old white woman with a history of depression
- Social history: Smoking (cigarettes socially on weekends); alcohol 1 to 2 drinks most days of the week; exercises five times a week (aerobic exercise for 45 minutes); gluten free diet, minimizes sodium and red meat
- Medications: sertraline 100 mg daily
- Family history: Father died of MI at age 40 yrs, one brother had CV events at age 51 years
- Laboratory values:
 - TC 210 mg/dL, LDL-C 140 mg/dL, HDL 40 mg/dL, TG 150 mg/dL
- Other values:
 - BP 136/88 mm Hg (134/86 when repeated), A1C 5.2%, BMI 23.4 kg/m²
 - All other labs are normal
- 10-year ASCVD risk score is 5.8%



Case Scenario 1: Lara (Cont'd)

- You confirm that Lara's BP values are measured correctly in the clinic, and they are Stage 1 HTN. Which of the following is the most appropriate next step in addition to implementing healthy lifestyle changes?
 - A. Bring patient back in 3 to 6 months after implementing healthy lifestyle changes
 - B. Start one antihypertensive medication**
 - C. Start two antihypertensive medications
 - D. Obtain out-of-office BP measurements



Case Scenario 1: Lara (Cont'd)

- Which of the following healthy lifestyle changes should you recommend for Lara?
 - A. Weight loss
 - B. Increased exercise
 - C. Limiting alcohol consumption
 - D. All of the above





Case Scenario 2: Tom

- Tom is a 40-year-old black man with a history of GERD and gout
- Social history: Smoker (0.5 pack/day for 20 years); alcohol 3 to 4 drinks per week; minimal exercise; follows no specific diet
- Medications: Omeprazole 40 mg PO daily, allopurinol 300 mg PO daily
- Reports adherence with all medications
- Laboratory values:
 - TC 220 mg/dL, LDL-C: 149 mg/dL, HDL 35 mg/dL, TG 180 mg/dL
- Other values:
 - BP 138/86 mm Hg (138/88 when repeated), A1C 5.5%, BMI 28.8 kg/m², SCr 1.2 mg/dL (eGFR 89 mL/min/1.73 m²), urinalysis shows no albuminuria (15 mg/g)
 - All other labs are normal
- ASCVD Risk Score = 12.1%



Case Scenario 2: Tom (Cont'd)

- Assume you decide to initiate a BP lowering medication for Tom to improve his BP. Which of the following would be the best 1st line treatment for him?
 - A. Lifestyle approaches + lisinopril 10 mg PO daily
 - B. Lifestyle approaches + chlorthalidone 12.5 mg PO daily**
 - C. Lifestyle approaches + Valsartan 80 mg
 - D. Lifestyle approaches + amlodipine 5 mg daily



Case Scenario 2: Tom (Cont'd)

- After initiating a BP medication in Tom, when would you want to reassess his BP in clinic?
 - A. 1 week
 - B. 4 weeks
 - C. 8 weeks
 - D. 12 weeks





Case Scenario 3: Sam

- Sam is a 55-year-old white man with a history of HTN, hypercholesterolemia, COPD, and DM type 2
- Social history: Smoker (1 pack/day for 30 years); alcohol 2 to 3 drinks per week; minimal exercise; follows no specific diet
- Medications: pravastatin 40 mg daily, olmesartan/HCTZ 40/25 mg daily, amlodipine 10 mg daily, metformin 1000 mg twice daily, liraglutide 1.8 mg SC daily
- Reports adherence to all medications
- Laboratory values:
 - TC 180 mg/dL, LDL-C 110 mg/dL, HDL 30 mg/dL, TG 200 mg/dL
- Other values:
 - BP 150/94 mm Hg (154/92 when repeated), A1C 6.7%, BMI 33.4 kg/m², SCr 1.2 mg/dL (eGFR 66 mL/min/1.73 m²), potassium 4 mEq/L, urinalysis shows albuminuria (200 mg/g)
 - All other labs are normal
 - BP was “extremely high” prior to starting antihypertensive medication



Case Scenario 3: Sam (Cont'd)

- Which of the following is the most appropriate change to Sam's regimen?
 - A. Reevaluate 1 month after additional healthy lifestyle changes
 - B. Change HCTZ to chlorthalidone
 - C. Start carvedilol
 - D. Start spironolactone



THANK YOU

