AETC AIDS Education & Training Center Program
Southeast

Webcast Wednesday
Metabolic Madness Part 1: Updates in Hypertension

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Disclosures

- The activity planners and speakers do not have any financial relationships with commercial entities to disclose.

- The speakers will not discuss any off-label use or investigational product during the program.

Objectives

- Discuss updates in the management of hypertension in persons with HIV
- Apply evidence-based recommendations to non-pharmacologic and pharmacologic treatment
- Identify counseling pearls for pharmacologic and non-pharmacologic therapies

Abbreviations

- Hypertension (HTN)
- Systolic blood pressure (SBP)
- Diastolic blood pressure (DBP)
- Chronic Kidney Disease (CKD)
- Cardiovascular Disease (CVD)
- Black box warning (BBW)
- Contraindication (CI)
- Beta Blocker (βB)
- Angiotensin Converting Enzyme Inhibitor (ACEi)
- Angiotensin Receptor Blocker (ARB)
- Calcium Channel Blocker (CCB)
- Aldosterone Antagonist/African American (AA)

2021 Statistics

- HTN was the primary cause of 691,095 deaths in the US
- 48.1% of adults in the US have HTN
- 22.5% of adults with HTN are controlled
- HTN costs the US approximately $131 billion annually between 2003-2014
- 56% of non-Hispanic black adults have HTN
  - Non-Hispanic white adults (48%)
  - Non-Hispanic Asian adults (46%)
  - Hispanic adults (39%)

Centers for Disease Control and Prevention, Facts About Hypertension. Atlanta, GA: Centers for Disease Control and Prevention; 2023
Centers for Disease Control and Prevention, National Center for Health Statistics. About Multiple Cause of Death, 1999–2020. CDC WONDER Online Database website. Atlanta, GA: Centers for Disease Control and Prevention; 2022

Cardiovascular Disease in PWH

- Increased risk of developing CVD in PWH compared to those uninfected
- Increased risk of MI, ischemic stroke, HF, pulmonary HTN, and venous thrombosis
  - Likely due to chronic immune activation and inflammation
  - Lower CD4 count associated with higher MI risk
  - Lower CD4/CD8 ratio associated with grater risk of coronary atherosclerosis
- Combination of low CD4 count and higher HIV viremia or coinfection with hepatitis C are associated with increased risk of stroke

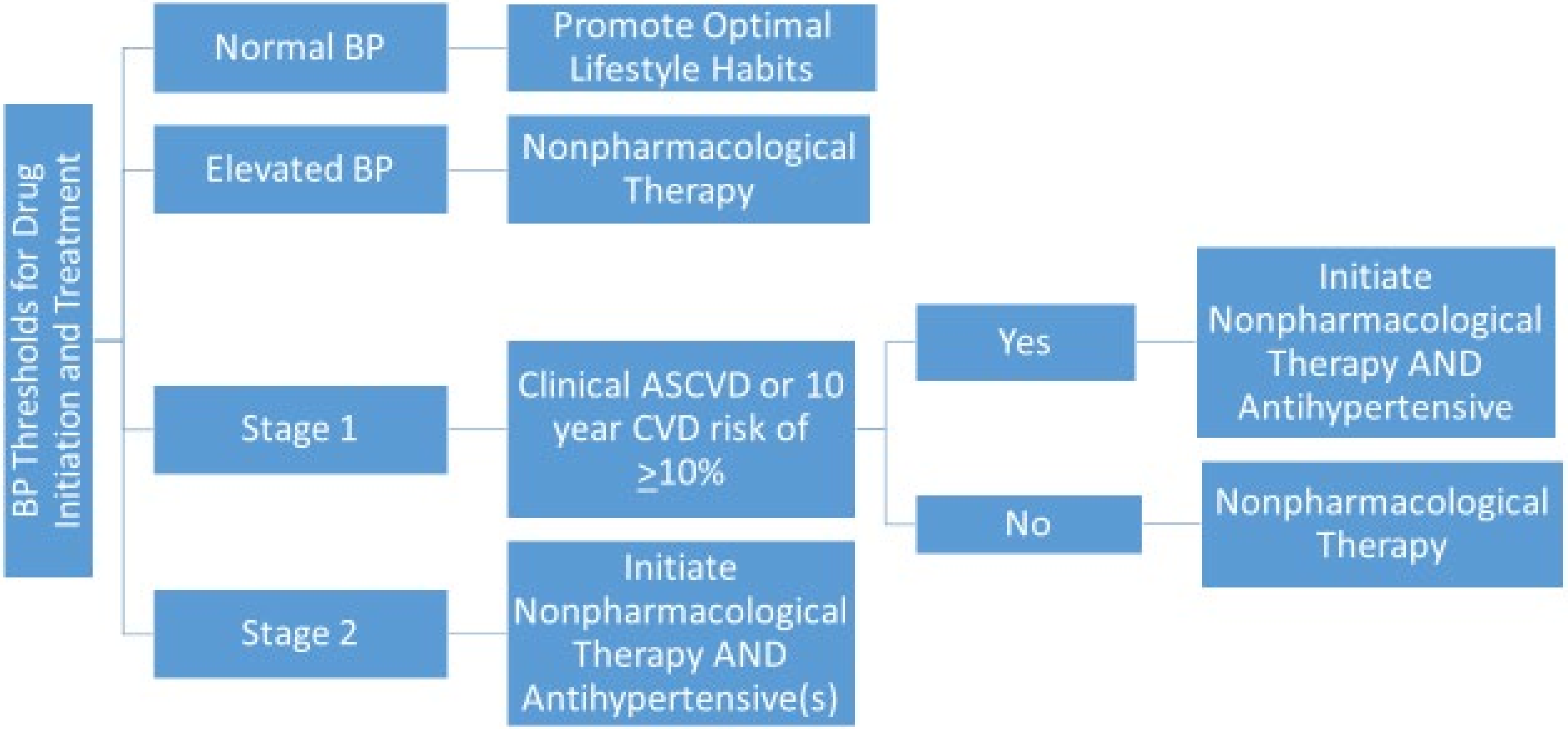
Drug Induced Secondary HTN

- Estrogens
- Herbal/Dietary Supplements
  - Licorice, ephedra, ma huang, bitter orange
- Decongestants (e.g. pseudoephedrine)
- Caffeine
- Corticosteroids
- NSAIDs, COX 2 Inhibitors
- Calcineurin inhibitors (e.g. cyclosporine and tacrolimus)
- Erythropoietin stimulating agents (e.g. erythropoetin, darbepoetin)
- Antidepressants (e.g. venlafaxine, desvenlafaxine, bupropion)
- Illicit drugs: cocaine (cocaine withdrawal), amphetamines
- Nicotine and nicotine withdrawal
- Certain ARTs

2017 Adult BP Classification

Stage	SBP (mmHg)		DBP (mmHg)
Optimal	<120	**and**	<80
Elevated	120-129	**and**	<80
Stage I HTN	130-139	**or**	80-89
Stage II HTN	≥140	**or**	≥90

J Am Coll Cardiol. 2018 May 15;71(19):e127-e248



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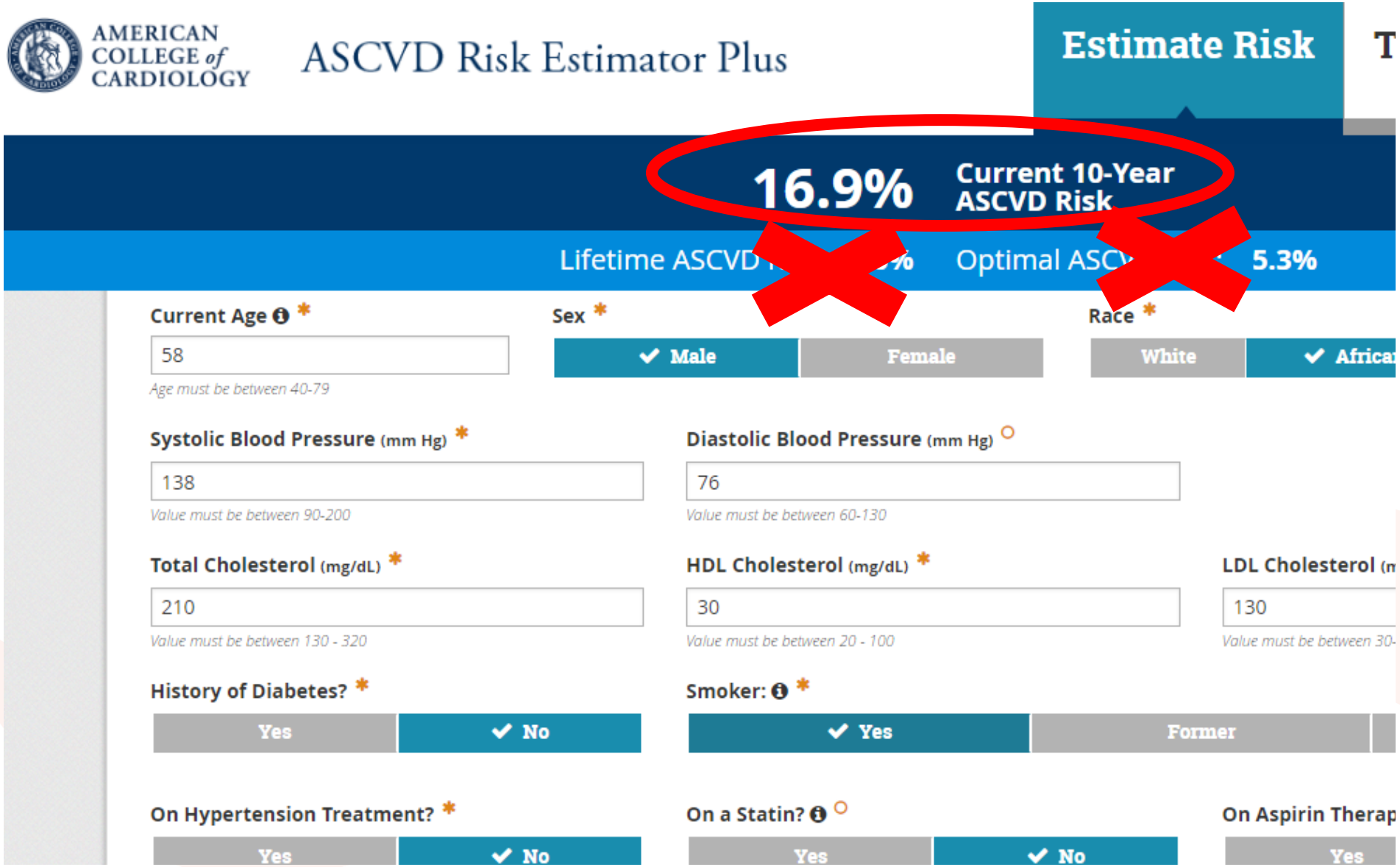
Do We Treat TL?

http://tools.acc.org/ASCVD-Risk-Estimator-Plus/

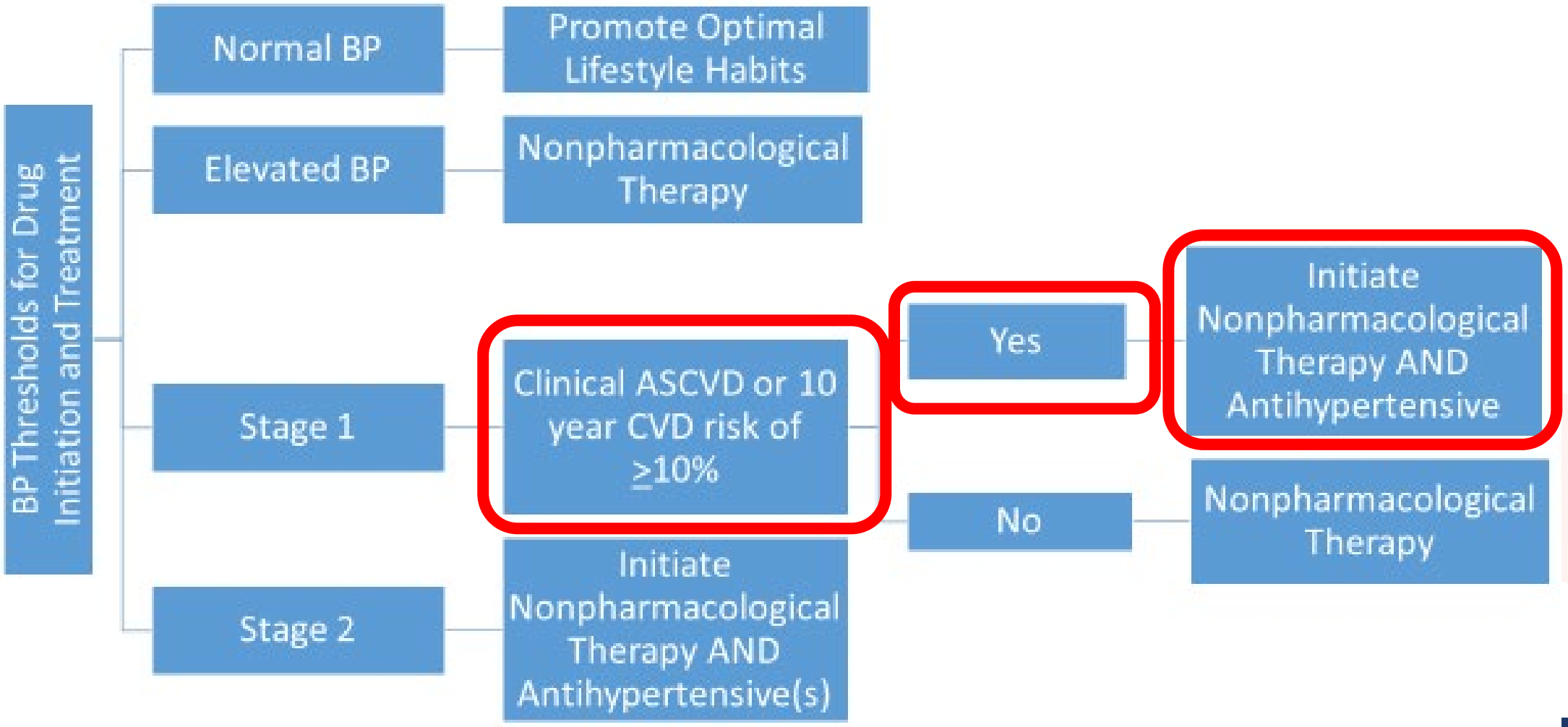
Other Information

- TC: 210 mg/dl
- LDL: 130 mg/dl
- HDL: 30 mg/dl
- TG:250 mg/dl
- Social hx: (-) alcohol, + TOB, or (-) illicit drugs
- No aspirin
- No statin



http://tools.acc.org/ASCVD-Risk-Estimator-Plus/

WHEN DO WE TREAT?



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Once pharmacologic treatment is started, what is the BP goal?

<130/80

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Therapy

Non-Pharmacologic

- Limit sodium
- Limit alcohol
- Increase physical activity
- Limit caffeine
- Smoking cessation
- DASH Diet

First Line

- Thiazide
- ACEi
- ARB
- CCB

African American

- CCB
- Thiazide

CKD

- ACEi or ARB

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Thiazide Diuretics

Medication	Usual Dose Range	Frequency
Hydrochlorothiazide (HydroDIURIL)	12.5-*50 mg*	1
Chlorthalidone	12.5*-25 mg	1
Indapamide	1.25-2.5 mg	1
Metolazone (Zaroxolyn)	2.5-5 mg	1

Thiazide Considerations

- Advise on appropriate time of day dosing
- Photosensitivity
- Gout
- May have benefit in osteoporosis
- OTC medications/diet
- Monitoring: Blood pressure; BUN, serum creatinine; serum electrolytes (potassium, magnesium, calcium, sodium); uric acid
  - Consider blood glucose and cholesterol
  - Renal function consideration
    - Lack of efficacy in CrCl <10 ml/min
    - May consider metolazone

Angiotensin Converting Enzyme Inhibitors (ACEI)

Medication	Usual Dose Range	Frequency
Benaze**pril** (Lotensin)	10-40 mg	Divided in 1-2 doses
Capto**pril** (Capoten)	12.5-150 mg	Divided in 2-3 doses
Enala**pril** (Vasotec)	5-40 mg	Divided in 1-2 doses
Fosino**pril** (Monopril)	10-40 mg	Divided in 1-2 doses
Lisino**pril** (Zestril, Prinivil)	10-40 mg	1
Moexi**pril** (Univasc)	7.5-30 mg	Divided in 1-2 doses
Perindo**pril** (Aceon)	4-16 mg	1
Quina**pril** (Accupril)	10-80 mg	Divided in 1-2 doses
Rami**pril** (Altace)	2.5-20 mg	Divided in 1-2 doses
Trandola**pril** (Mavik)	1-4 mg	1

Angiotensin Receptor Blockers (ARBs)

Medication	Usual Dose Range	Frequency
Azil**sartan** (Edarbi)	40-80 mg	1
Cande**sartan** (Atacand)	8-32 mg	1
Epro**sartan** (Teveten)	600-800 mg	Divided in 1-2 doses
Irbe**sartan** (Avapro)	150-300 mg	1
Lo**sartan** (Cozaar)	25-100 mg	Divided in 1-2 doses
Olme**sartan** (Benicar)	20-40 mg	1
Telmi**sartan** (Micardis)	20-80 mg	1
Val**sartan** (Diovan)	80-320 mg	Divided in 1-2 doses

ACEi and ARB Considerations

- Contraindications
  - Pregnancy
  - Bilateral renal artery stenosis
- Dry Cough?
- Angioedema?

Beta Blockers and HIV

- Antihypertensive Class and Cardiovascular Outcomes in Patients With HIV and Hypertension
  - BBs may increase CVD in PWH if used as initial therapy
  - ACEi/ARBs may have additional benefits in PWH
    - May lower the risk of developing heart failure

Dihydropyridine (DHP) CCBs

Medication	Usual Dose Range	Frequency
Amlod**ipine** (Norvasc)	2.5-10 mg	1
Felod**ipine** (Plendil)	2.5-10 mg	1
Israd**ipine** (DynaCirc)	5-10 mg	Divided in 2 doses
Nicard**ipine** sustained release (Cardene SR)	60-120 mg	Divided in 2 doses
Nifed**ipine** long acting (Adalat CC, Procardia XL)	30-90 mg	1
Nisold**ipine** (Sular)	17-34 mg	1

Considerations in PWH: Potential Drug Interactions: CCBs

- PIs, cobicistat/elvitegravir/emtricitabine/tenofovir DF, or cobicistat/elvitegravir/emtricitabine/tenofovir AF may increase levels of amlodipine, nifedipine, and felodipine
  - Consider starting at lower doses
- Diltiazem's dose should be dose reduced by 50% in coadministration with atazanavir

Corbett AH, Sheffield CI. Key Pharmacologic Principles and Drug-Drug Interactions in HIV Patient Care. June 2019.

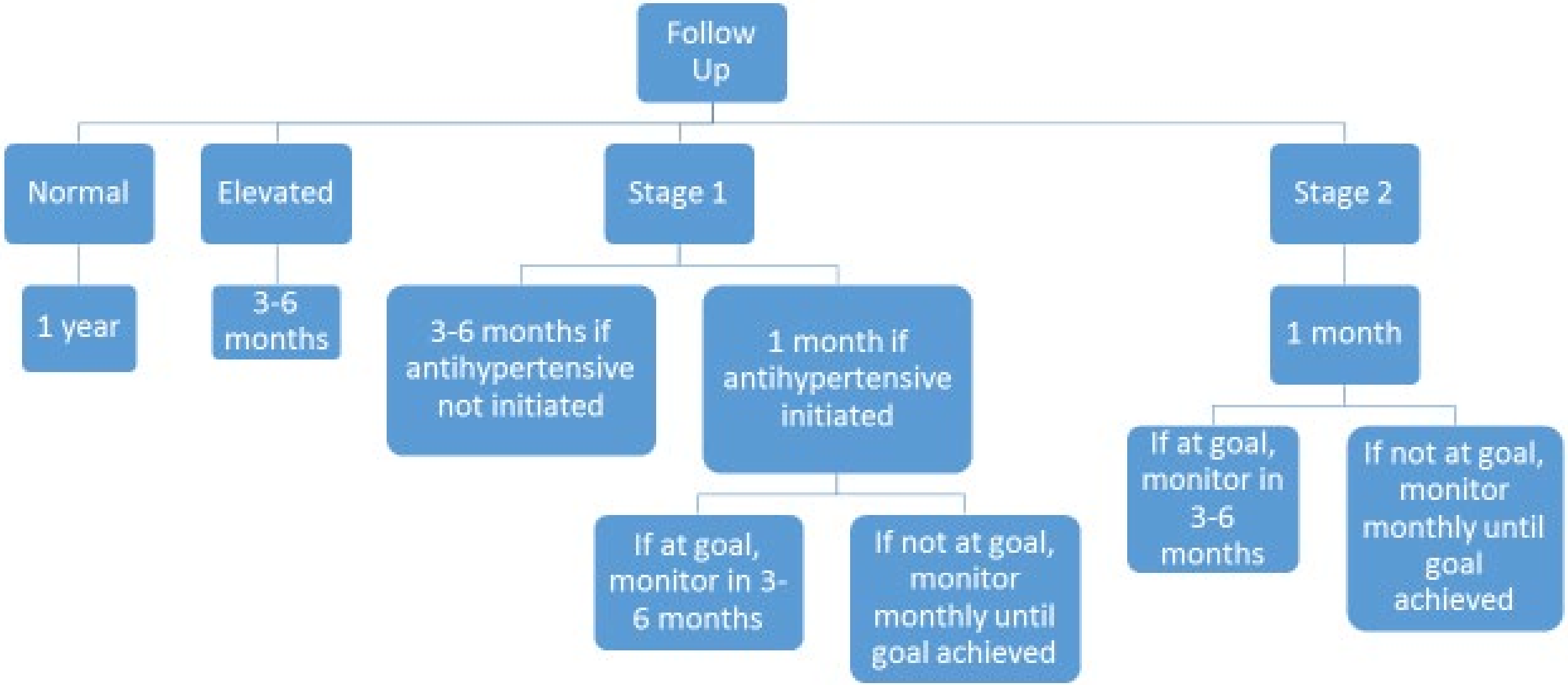
Considerations in PWH: Potential Drug Interactions: BB

- PIs may increase the concentration of metoprolol, carvedilol, and propranolol
- Tipranavir/ritonavir may increase concentrations of metoprolol and carvedilol
- Cobicistat/elvitegravir/emtricitabine/tenofovir DF and cobicistat/elvitegravir/emtricitabine/tenofovir AF may increase concentrations of metoprolol and timolol
- Consider starting above BB at low doses
- Atazanavir/cobicistat or darunavir/cobicistat in combination with a BB should be monitored

Corbett AH, Sheffield CI. Key Pharmacologic Principles and Drug-Drug Interactions in HIV Patient Care. June 2019.

Alternative Agents

- Should be used as add-on therapy to 1st line agents
  - βBs
  - α-βBs
  - Loop diuretics
  - Potassium sparing diuretics
  - Aldosterone Antagonists
  - *α1 Blockers*
  - Direct Renin Inhibitor
  - Central Acting α2 Agonists
  - Direct Acting Vasodilators
  - *Reserpine*



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Dosing Strategies

- Stage 1:
  - Start **one** drug and titrate to maximum effective dose (if needed)
  - If not at goal, **add** a second drug
- Stage 2:
  - SBP: 140-150 mmHg
    - Start **one** medication and titrate/add additional drug if necessary
  - SBP: >150 mmHg (SBP >20mmHg above goal)
    - Start **two** drugs at the same time either as two separate tablets or a single formulation and titrate/add additional agent if necessary

Follow up

- Efficacy
  - Patient should be evaluated 4 weeks (1 month) after initiation of therapy or changes to therapy
  - Once at goal, monitor every 3-6 months thereafter
- Toxicity
  - Monitor labs at baseline and 3-4 weeks after initiation of therapy or dose increases
  - Monitor every 6-12 months thereafter once stable

Getting to Goal

- If BP goal is not achieved within 1 month of initiation
  - Consider dose titration or the addition of a second medication
- If BP goal is not achieved with 2 medications
  - Add 3rd medication
  - Do not use ACEI and ARB together
  - Consider ACEi or ARB + thiazide or CCB for dual therapy
  - Try avoiding βB and Non DHP CCB combination
- If requiring more than 3 medications, may need to choose from a second line option

Summary

- Choose guideline directed therapy
- Ensure patient counseling
- Pair pharmacologic therapy with non pharmacologic recommendations

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