

SMALL INTERACTIVE SESSION

DIABETES AND CVD IN PRIMARY CARE:
LASSO-UP THE LATEST GUIDELINES FOR BEST
OUTCOMES!

A PATIENT CASE APPROACH TO INTEGRATING THE
ACC/AHA AND ADA/AACE RECOMMENDATIONS

AAPA Conference

May 19, 2024 at 3:00PM to 5:00PM

Houston, TX 2024

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BAYLOR COLLEGE OF MEDICINE

DEPARTMENT OF MEDICINE | SCHOOL OF HEALTH PROFESSIONS | PHYSICIAN ASSISTANT PROGRAM

HOUSTON, TEXAS

Baylor
College of
Medicine



I have no relevant relationships with ineligible companies to disclose within the past 24 months.

OBJECTIVES

At the conclusion of this session, participants should be able to:

- 1. Identify patients with, or at high-risk of, diabetes and cardiovascular disease with screening methodologies from the USPSTF and other authorities*
- 2. Interpret current diagnostic guidelines for cardiovascular disease from ACC/AHA and diabetes from ADA and the AACE*
- 3. Develop individualized treatment plans using shared-decision approaches rooted in evidence-based pharmacotherapeutics including the latest agents such as SGLT2-inhibitors, GLP1-receptor agonists, and PCSK9 inhibitors*
- 4. Counsel and motivate diverse patient populations with culturally informed lifestyle modifications while considering social determinants of health*

Acronyms

- **USPSTF** - United States Preventive Services Task Force
- **ADA** - American Diabetes Association
- **AACE** - American Association of Clinical Endocrinologists
- **ACE** - American College of Endocrinologists
- **ACC** - American College of Cardiologists
- **ACP** - American College of Physicians
- **AHA** - American Heart Association
- **GDM** - Gestational Diabetes Mellitus
- **CKD** - Chronic kidney disease
- **ASCVD** – Atherosclerotic Cardiovascular Disease

HYPERTENSION



HYPERTENSION **SCREENING**: USPSTF

Figure. Clinician Summary: Screening for Hypertension in Adults

What does the USPSTF recommend?	Screen adults for hypertension. <u>Grade: A</u>
To whom does this recommendation apply?	Adults 18 years or older without known hypertension.
How to implement this recommendation?	<p>1. Screen: Measure blood pressure with an office blood pressure measurement.</p> <p>2. Confirm: Take blood pressure measurements outside of the clinical setting to confirm a hypertension diagnosis before starting treatment.</p> <p>Ways to measure blood pressure outside of the clinical setting include</p> <ul style="list-style-type: none">• Ambulatory blood pressure monitoring: patients wear a programmed portable device that automatically takes blood pressure measurements, typically in 20- to 30-minute intervals over 12 to 24 hours while patients go about their normal activities or are sleeping.• Home blood pressure monitoring: patients measure their own blood pressure at home with an automated device. Measurements are taken much less frequently than with ambulatory blood pressure monitoring (eg, 1 to 2 times a day or week, although they can be spread out over more time).• Blood pressure measurements should be taken at the brachial artery (upper arm) with a validated and accurate device in a seated position after 5 minutes of rest.
How often?	<p>Although evidence on optimal screening intervals is limited, reasonable options include</p> <ul style="list-style-type: none">• Screening for hypertension every year in adults 40 years or older and in adults at increased risk for hypertension (such as Black persons, persons with high-normal blood pressure, or persons who are overweight or obese).• Screening less frequently (ie, every 3-5 years) as appropriate for adults aged 18 to 39 years not at increased risk for hypertension and with a prior normal blood pressure reading.

HYPERTENSION **SCREENING**: Categorize BP Readings

Blood Pressure Categories



BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		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

How to measure your blood pressure at home

Follow these steps for an accurate blood pressure reading

1 PREPARE

Avoid caffeine, cigarettes and other stimulants 30 minutes before you measure your blood pressure.

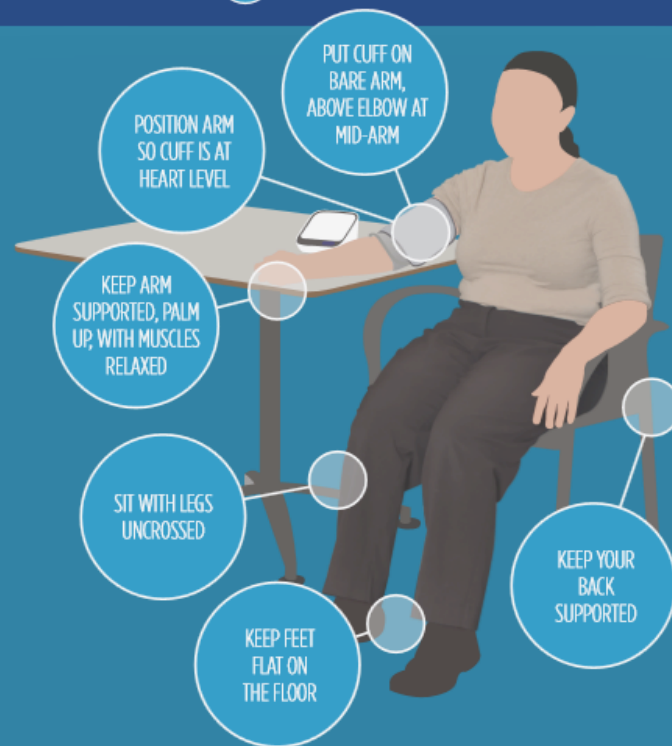
Wait at least 30 minutes after a meal.

If you're on blood pressure medication, measure your BP **before** you take your medication.

Empty your bladder beforehand.

Find a quiet space where you can sit comfortably without distraction.

2 POSITION



3 MEASURE

Rest for five minutes while in position before starting.

Take two or three measurements, one minute apart.

Keep your body relaxed and in position during measurements.

Sit quietly with no distractions during measurements—avoid conversations, TV, phones and other devices.

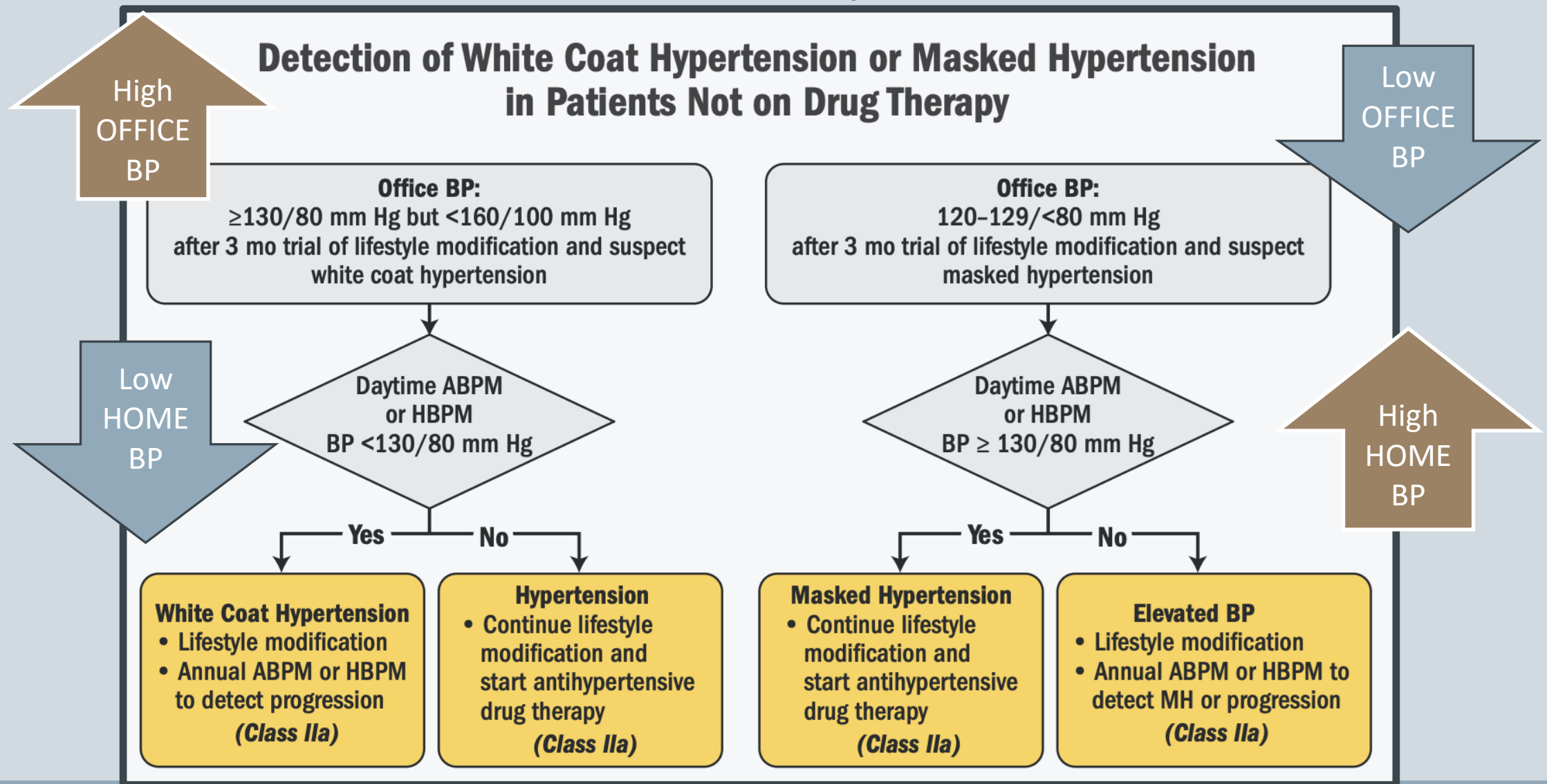
Record your measurements when finished.

TARGET:BP™



This Prepare, position, measure handout was adapted with permission of the American Medical Association and The Johns Hopkins University. The original copyrighted content can be found at <https://www.ama-assn.org/ama-johns-hopkins-blood-pressure-resources>.

HYPERTENSION **DIAGNOSIS**: Verify *White Coat* vs *Masked* HTN





Mejorar y mantener la salud cardiovascular, o CVH (por sus siglas en inglés), puede ayudarlo a disfrutar de una vida más larga y saludable. Una mejor CVH también se asocia con la disminución del riesgo de enfermedades cardíacas, accidentes cerebrovasculares, cáncer, demencia y otros problemas de salud importantes.

Life's Essential 8 describe algunos sencillos pasos que puede seguir para llevar un estilo de vida más saludable.

✓ MEJORE SU ALIMENTACIÓN

Busque un patrón de alimentación saludable que incluya alimentos integrales, muchas frutas y verduras, proteínas magras, frutos secos, semillas y cocinar con aceites no tropicales, como el de oliva y el de canola.

✓ CONTROLE SU PESO

Alcanzar y mantener un peso saludable tiene muchos beneficios. El índice de masa corporal (IMC), un valor numérico de su peso en relación con su altura, es un indicador útil. El IMC óptimo para la mayoría de los adultos varía entre 18,5 y menos de 25. Puede calcularlo en línea o consultar con un profesional de la salud.

✓ SEA MÁS ACTIVO

Los adultos deben realizar 150 minutos de actividad física moderada o 75 minutos de actividad física intensa. Caminar es bueno para niveles de actividad moderada. Los niños deben realizar 60 minutos todos los días, incluidos juegos y actividades estructuradas.

✓ CONTROLE EL COLESTEROL

Los niveles altos de colesterol no transportado por las lipoproteínas de alta densidad (HDL), o "bueno", pueden provocar enfermedades cardíacas. Su profesional de la salud puede considerar el colesterol no HDL como el número preferido que monitorear, en lugar del colesterol total, ya que se puede medir sin ayuno de antemano y se calcula de manera confiable en todas las personas.

✓ DEJE EL TABACO

El uso de productos de administración de nicotina inhalada, que incluye cigarrillos tradicionales, cigarrillos electrónicos y vapeo, es la causa principal de muerte prevenible en los EE. UU., incluye aproximadamente un tercio de todas las muertes por enfermedades cardíacas. Además, aproximadamente un tercio de los niños de los EE. UU. entre los 3 y los 11 años se encuentran expuestos al humo y vapor indirectos.

✓ CONTROLE LA GLUCEMIA

La mayoría de los alimentos que comemos se convierten en glucosa (o glucemia) que nuestro cuerpo utiliza como energía. Con el tiempo, los niveles altos de glucemia pueden dañar el corazón, los riñones, los ojos y los nervios. Como parte de las pruebas, el monitoreo de la hemoglobina A1c puede reflejar mejor el control a largo plazo en personas con diabetes o prediabetes.

✓ DUERMA LO SUFICIENTE

Dormir bien todas las noches es vital para la salud cardiovascular. Los adultos deben tener como objetivo un promedio de 7 a 9 horas, y los bebés y niños necesitan más según su edad. Los estudios indican que el sueño excesivo o insuficiente está asociado con enfermedades cardíacas.

✓ CONTROLE LA PRESIÓN ARTERIAL

Mantener la presión arterial dentro de márgenes aceptables puede mantenerlo saludable durante más tiempo. Los niveles inferiores a 120/80 mm Hg son los ideales. La presión arterial alta se define como una presión sistólica de 130-139 mm Hg (el número más alto en la lectura) o una presión diastólica de 80-89 mm Hg (el número inferior).






Obtenga más información en heart.org/lifes8



AHA Life's Essential 8™ Lifestyle Modifications



What Can I Do To Improve My Blood Pressure?

Modification	Recommendation	Approximate SBP Reduction Range
 Weight reduction	Maintain normal body weight (BMI=18.5-24.9 kg/m ²)	5 mm Hg
 DASH eating plan	Diet rich in fruits, vegetables, low fat dairy and reduced in fat	11 mm Hg
 Restrict sodium intake	<1500 mg of sodium per day	5-6 mm Hg
 Physical activity	Be more physically active. Aim for at least 90 to 150 minutes of aerobic exercise per week.	5-8 mm Hg
 Moderation of alcohol consumption	No more than 2 drinks/day for men and 1 drink/day for women	4 mm Hg

BP = Blood pressure, BMI = Body mass index, SBP = Systolic blood pressure, DASH = Dietary Approaches to Stop Hypertension

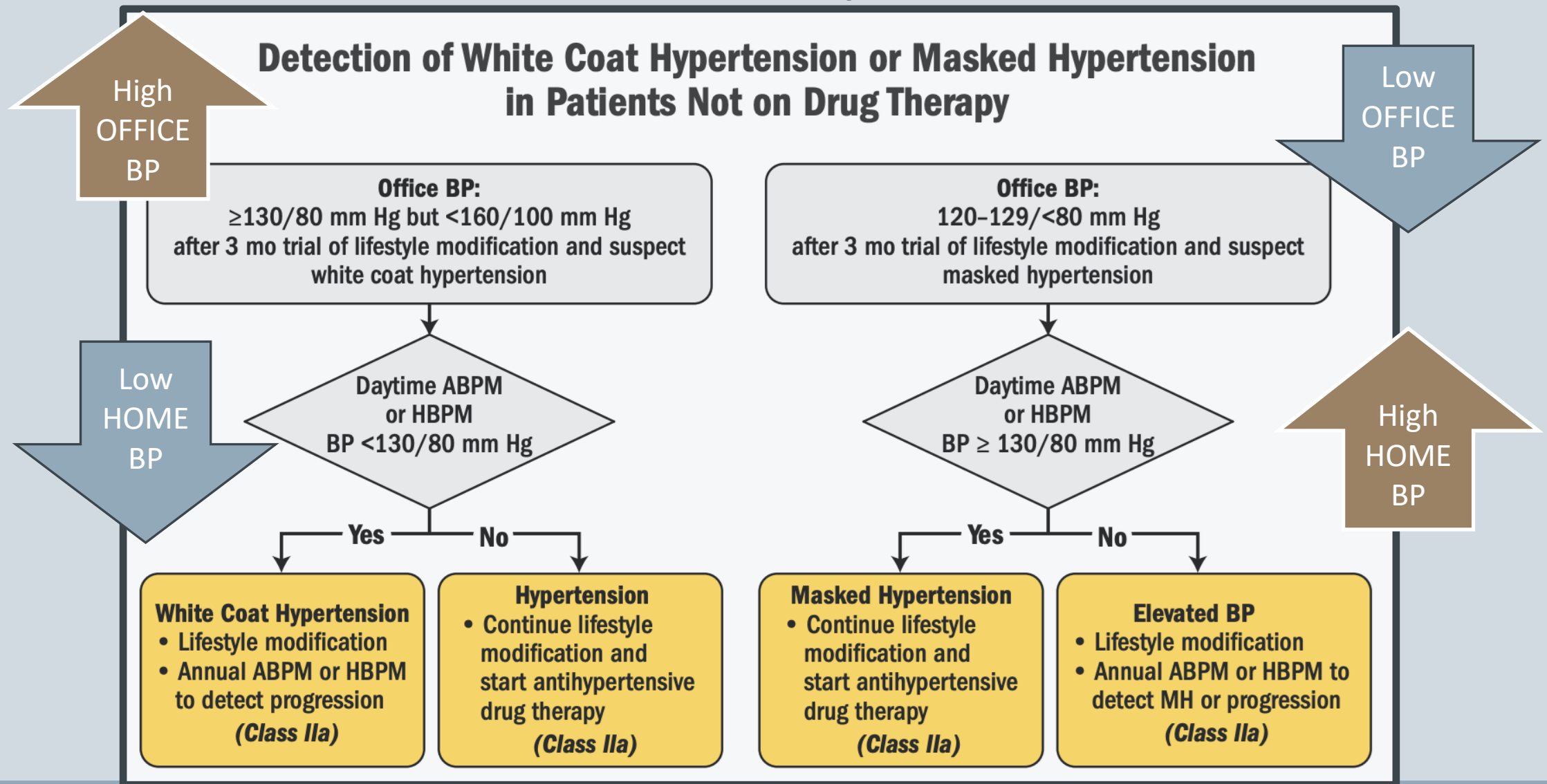


American Heart Association.

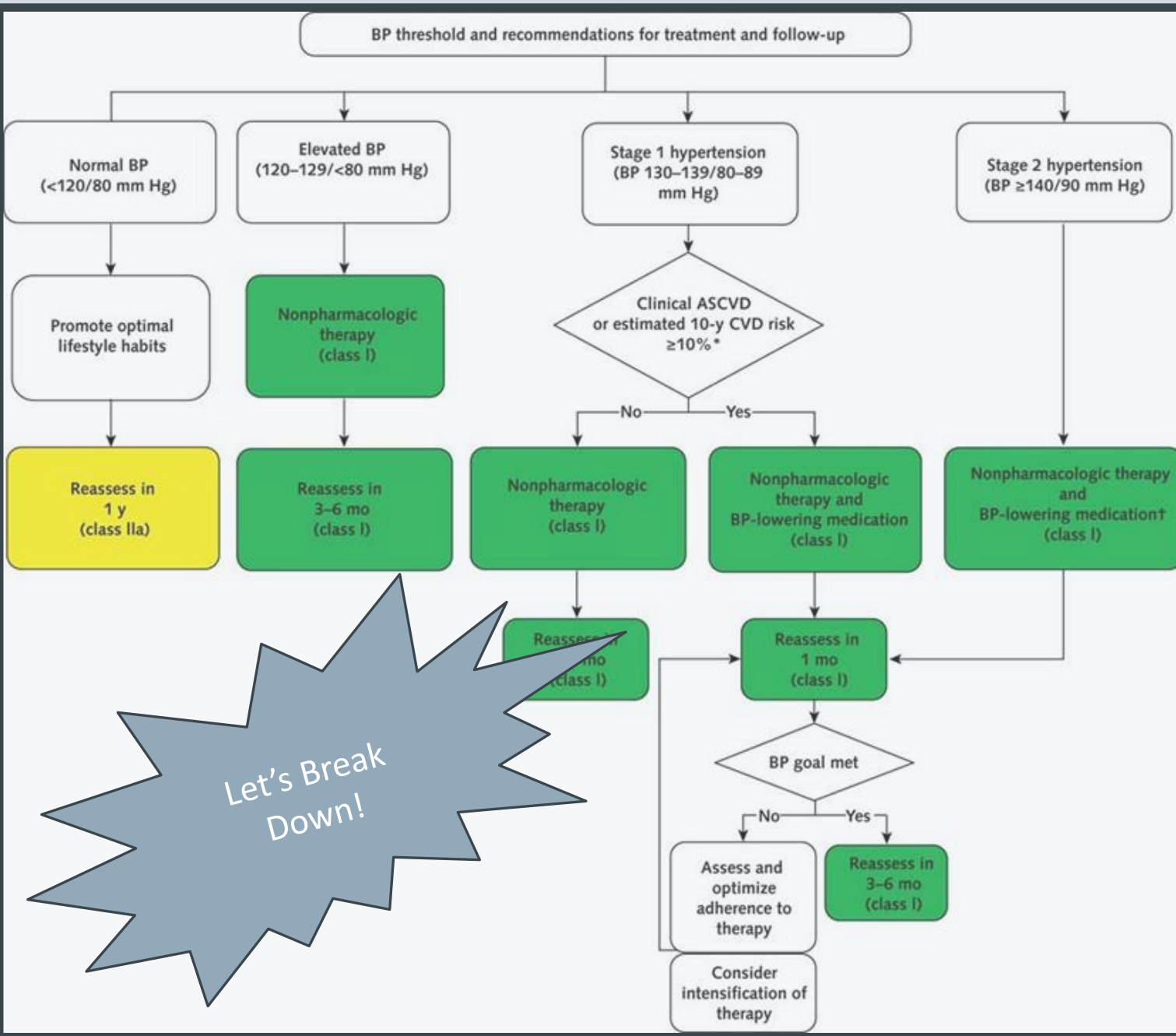
Ranges According to 2017 Hypertension Clinical Practice Guidelines
Recommendations for Treatment and Management of Hypertension



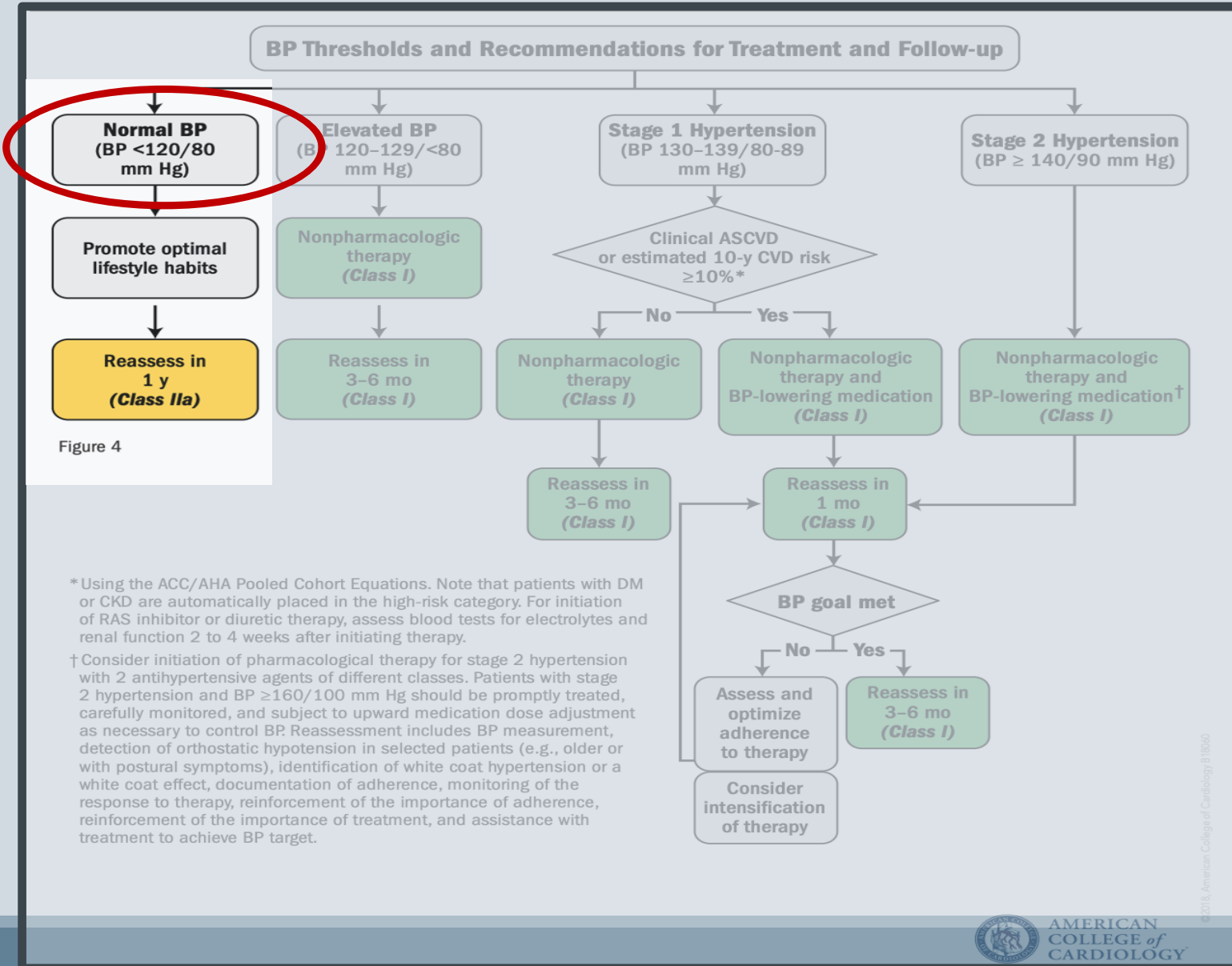
HYPERTENSION **DIAGNOSIS**: Verify *White Coat* vs *Masked* HTN



HYPERTENSION TREATMENT: ACC/AHA Guidelines



HYPERTENSION **TREATMENT**: ACC/AHA Guidelines



Normal BP:

<120/<80
mmHg

Treatment:

Promote Healthy Lifestyle Habits

HYPERTENSION **TREATMENT**: ACC/AHA Guidelines

Elevated BP:

120-129/<80
mmHg

Treatment:

Lifestyle
Modifications

BP Thresholds and Recommendations for Treatment and Follow-up

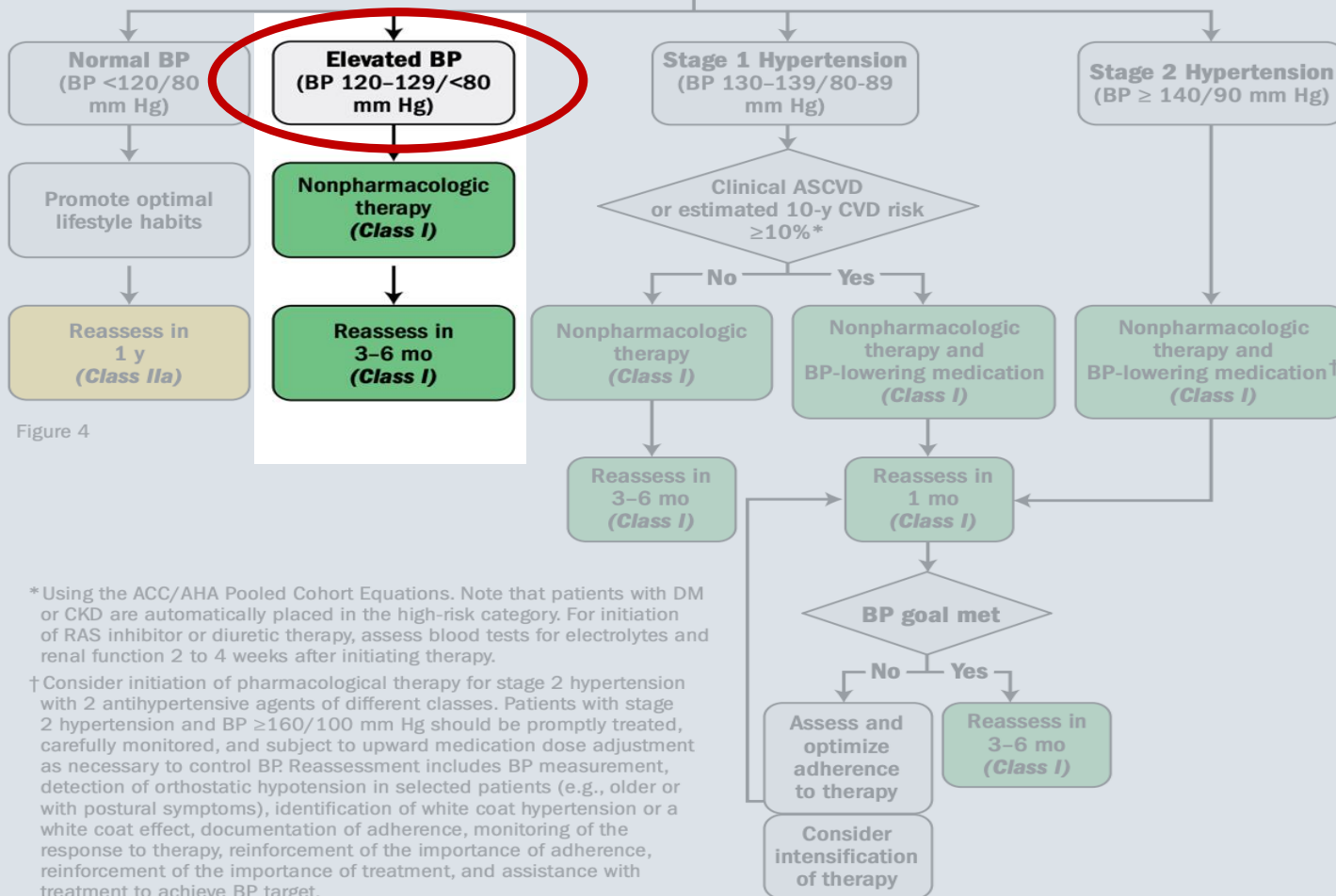







Figure 4

* Using the ACC/AHA Pooled Cohort Equations. Note that patients with DM or CKD are automatically placed in the high-risk category. For initiation of RAS inhibitor or diuretic therapy, assess blood tests for electrolytes and renal function 2 to 4 weeks after initiating therapy.

† Consider initiation of pharmacological therapy for stage 2 hypertension with 2 antihypertensive agents of different classes. Patients with stage 2 hypertension and BP $\geq 160/100$ mm Hg should be promptly treated, carefully monitored, and subject to upward medication dose adjustment as necessary to control BP. Reassessment includes BP measurement, detection of orthostatic hypotension in selected patients (e.g., older or with postural symptoms), identification of white coat hypertension or a white coat effect, documentation of adherence, monitoring of the response to therapy, reinforcement of the importance of adherence, reinforcement of the importance of treatment, and assistance with treatment to achieve BP target.



What Can I Do To Improve My Blood Pressure?

Modification	Recommendation	Approximate SBP Reduction Range
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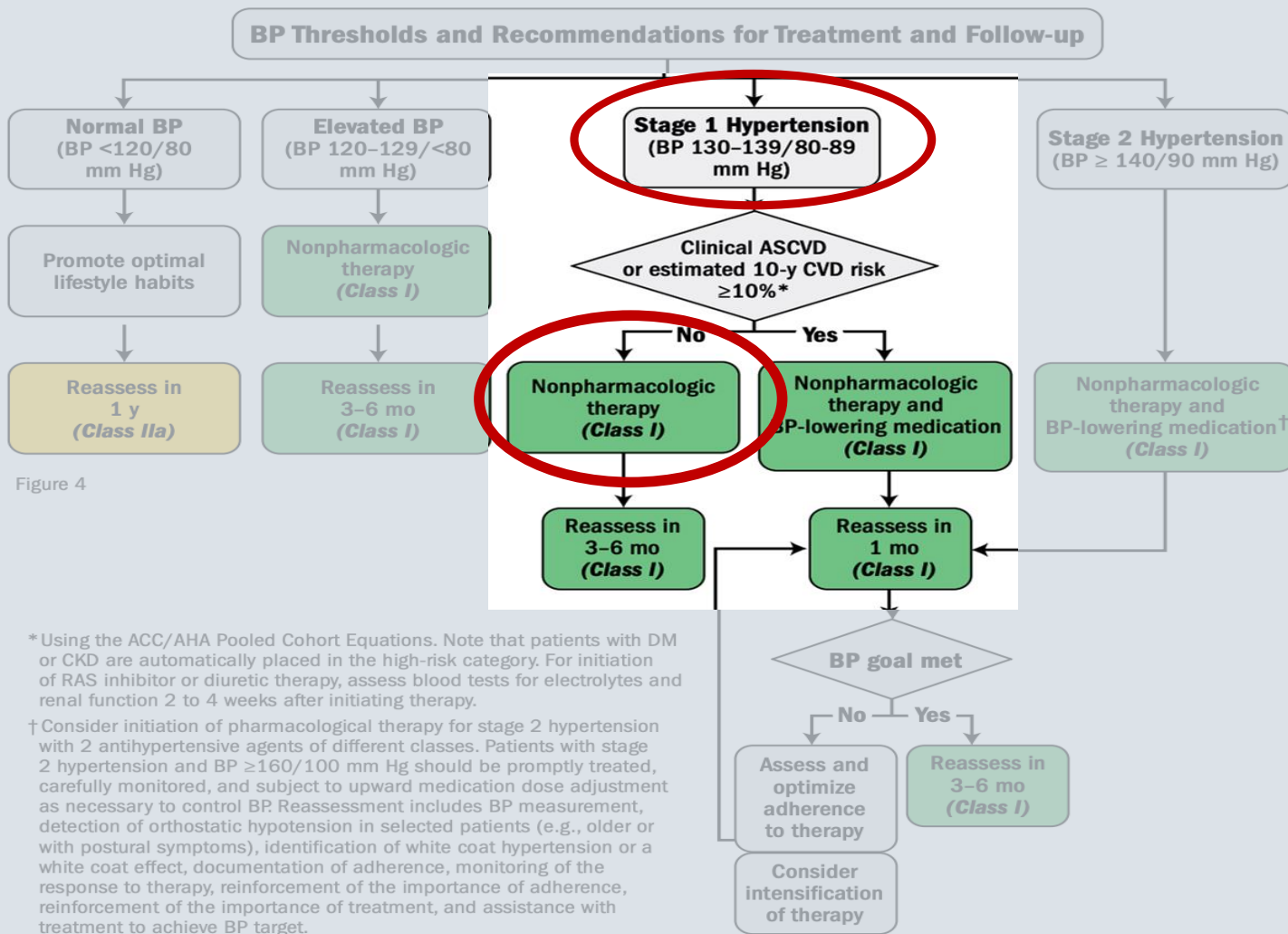
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Ranges According to 2017 Hypertension Clinical Practice Guidelines
Recommendations for Treatment and Management of Hypertension



HYPERTENSION **TREATMENT**: ACC/AHA Guidelines



STAGE 1:
130-139/80-89
mm Hg
 and
ASCVD ≤ 10%

ASCVD RISK ESTIMATOR **ASCVD \leq 10%**

4.7%
Low

Current 10-Year
ASCVD Risk**

Lifetime ASCVD Risk: **39%**

Optimal ASCVD Risk: **2.1%**

Current Age ⓘ *

59

Age must be between 20-79

Sex *

Male

✓ Female

Race *

✓ White

African American

Other

Systolic Blood Pressure (mm Hg) *

139

Value must be between 90-200

Diastolic Blood Pressure (mm Hg) *

89

Value must be between 60-130

Total Cholesterol (mg/dL) *

220

Value must be between 130 - 320

HDL Cholesterol (mg/dL) *

40

Value must be between 20 - 100

LDL Cholesterol (mg/dL) ⓘ ○

165

Value must be between 30-300

History of Diabetes? *

Yes

✓ No

Smoker? ⓘ *

Current ⓘ

Former ⓘ

✓ Never ⓘ

On Hypertension Treatment? *

Yes

✓ No

On a Statin? ⓘ ○

Yes

✓ No

On Aspirin Therapy? ⓘ ○

Yes

✓ No

HYPERTENSION **TREATMENT**: ACC/AHA Guidelines

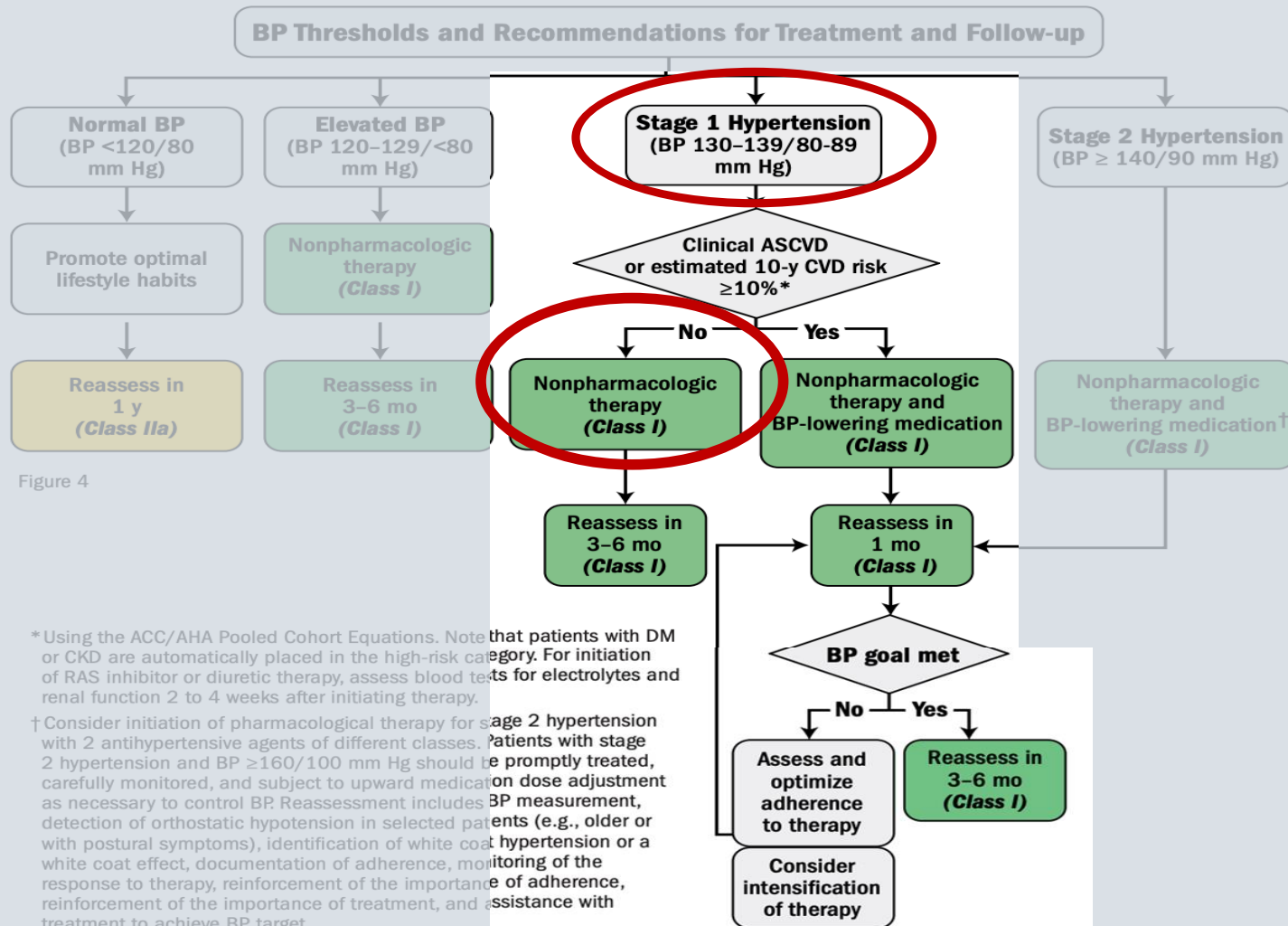


Figure 4

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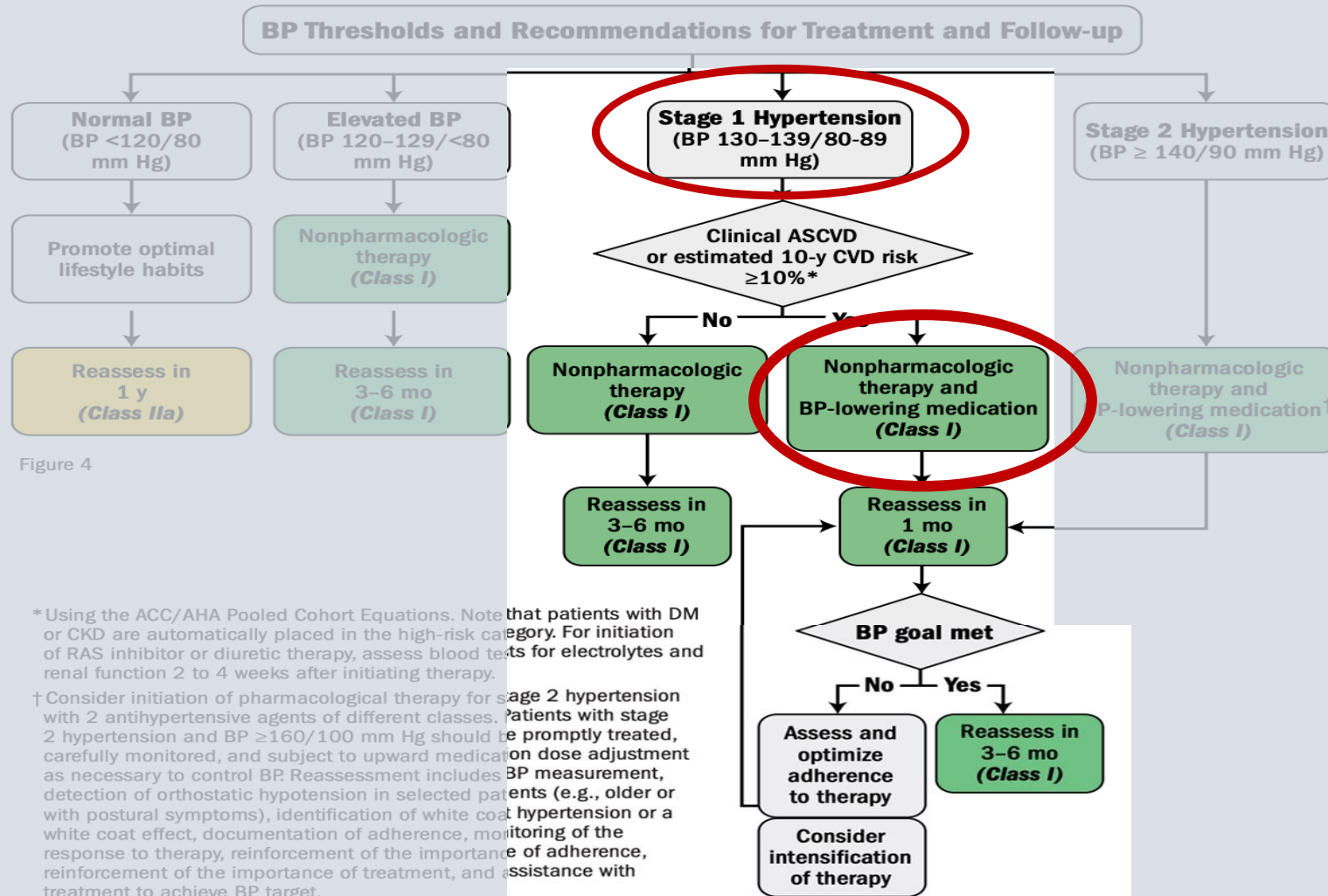
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STAGE 1:
 130-139/80-89 and
ASCVD $\leq 10\%$

TREATMENT:

Lifestyle
 Modifications &
 Recheck 3-6 mo

HYPERTENSION **TREATMENT**: ACC/AHA Guidelines



STAGE 1:
130-139/80-89
mm Hg
 and
ASCVD ≥ 10%

ASCVD RISK ESTIMATOR **ASCVD \geq 10%**

11.8%
Intermediate

Current 10-Year
ASCVD Risk**

Lifetime ASCVD Risk: **46%**

Optimal ASCVD Risk: **5.2%**

Current Age ⓘ *

59

Age must be between 20-79

Sex *

✓ Male

Female

Race *

✓ White

African American

Other

Systolic Blood Pressure (mm Hg) *

139

Value must be between 90-200

Diastolic Blood Pressure (mm Hg) *

89

Value must be between 60-130

Total Cholesterol (mg/dL) *

220

Value must be between 130 - 320

HDL Cholesterol (mg/dL) *

40

Value must be between 20 - 100

LDL Cholesterol (mg/dL) ⓘ ○

165

Value must be between 30-300

History of Diabetes? *

Yes

✓ No

Smoker? ⓘ *

Current ⓘ

Former ⓘ

✓ Never ⓘ

On Hypertension Treatment? *

Yes

✓ No

On a Statin? ⓘ ○

Yes

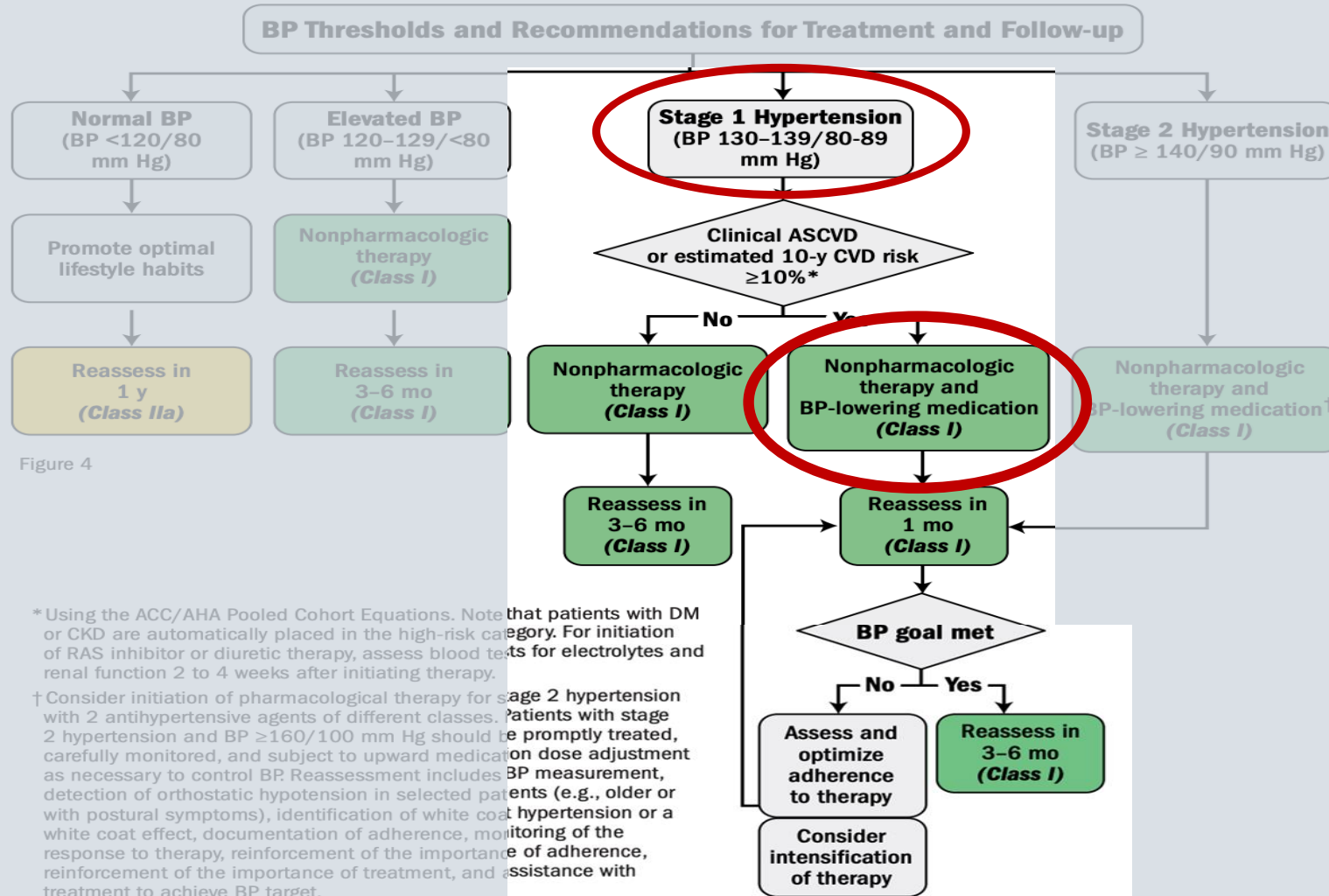
✓ No

On Aspirin Therapy? ⓘ ○

Yes

✓ No

HYPERTENSION **TREATMENT**: ACC/AHA Guidelines



STAGE 1:
130-139/80-89 and
ASCVD ≤10%

TREATMENT:
Lifestyle
Modifications &
Start Therapy

ASCVD \geq 10% STAGE 1 HYPERTENSION TREATMENT

RENIN-ANGIOTENSIN-ALDOSTERONE (RAA) BLOCKING AGENTS

- ✓ Angiotensin-Converting Enzyme Inhibitor (-pril e.g., *lisinopril*)
- ✓ Angiotensin Receptor Blockers (-sartan e.g., *olmesartan*)

CALCIUM CHANNEL BLOCKERS

- ✓ Dihydropyridine (-pine e.g., *amlodipine*)

DIURETICS

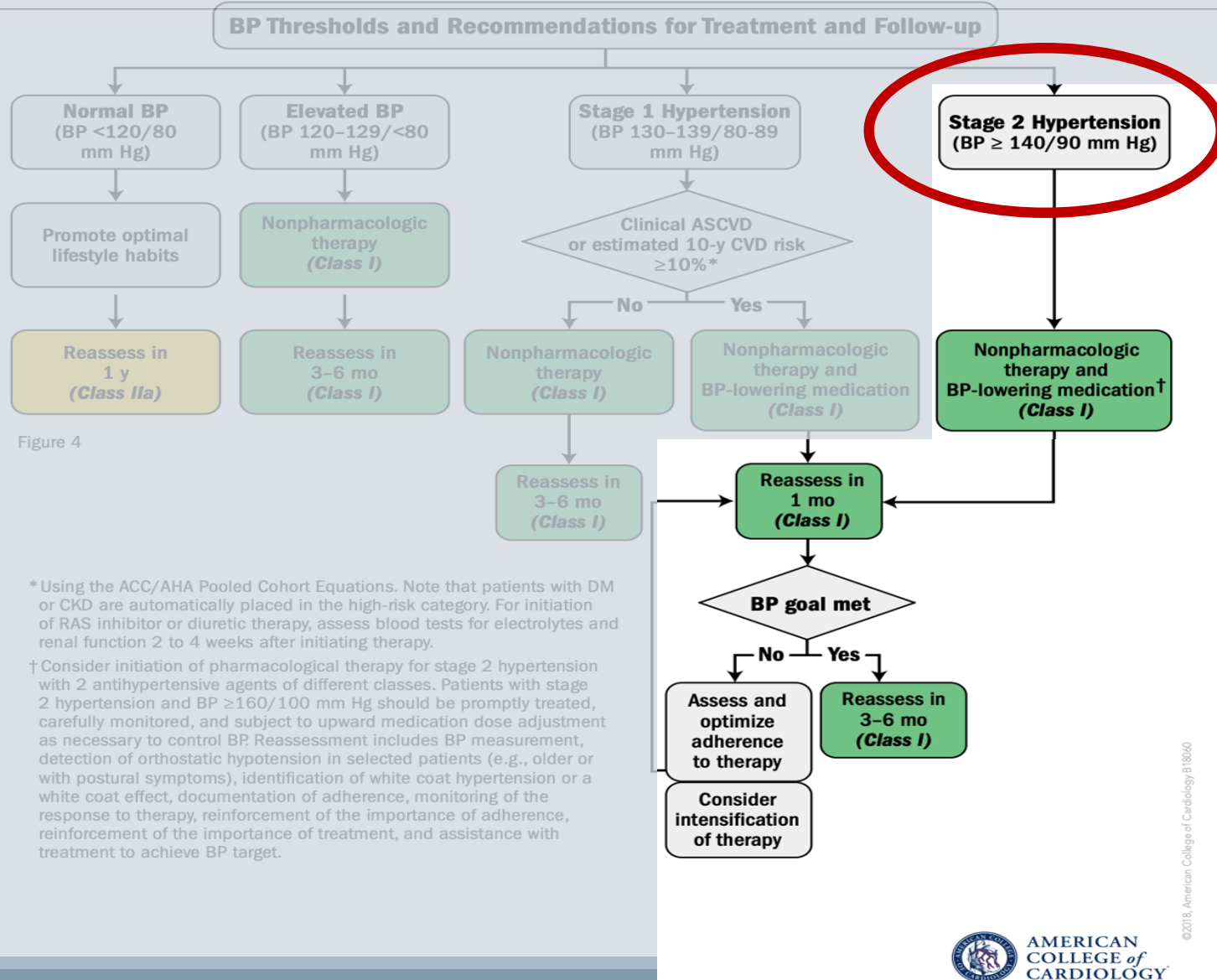
- ✓ Thiazides (-ide e.g., *hydrochlorothiazide*)

What About **Beta-Blockers**?

BETA-BLOCKERS

- ✓ Not recommended as first-line
- ✓ **MI** or **Ischemic Heart Disease** (IHD): Considered first-line in this population
- ✓ **HFrEF**: Bisoprolol, metoprolol succinate & carvedilol preferred
- ✓ Do **NOT** combine with CCB-nondihydropyridines due to increased risk of bradycardia and heart block

HYPERTENSION **TREATMENT**: ACC/AHA Guidelines



STAGE 2:
 $\geq 140/90$ mmHg
TREATMENT:
 Lifestyle
 Modifications &
 Optimize Meds



STAGE 2 HYPERTENSION TREATMENT

ACC recommends starting **TWO** first-line agents of different classes:

- ✓ **Stage 2** Hypertension
- ✓ BP more than 20/10 mm hg above their BP target



YOU STARTED TREATMENT,
WHAT'S NEXT?

**RECHECK
IN
1 MONTH**



If **AT GOAL** after *ONE*
month:
RECHECK
IN
3-6 MONTHS



If **NOT AT GOAL** after *ONE* month:

- ✓ **Confirm adherence to therapy**
- ✓ **Consider intensifying therapy**

STAGE 2 HYPERTENSION TREATMENT

RENIN-ANGIOTENSIN-ALDOSTERONE (RAA) BLOCKING AGENTS

- ✓ Angiotensin-Converting Enzyme Inhibitor (-pril e.g., *lisinopril*)
- ✓ Angiotensin Receptor Blockers (-sartan e.g., *olmesartan*)

CALCIUM CHANNEL BLOCKERS

- ✓ Dihydropyridine (-pine e.g., *amlodipine*)

DIURETICS

- ✓ Thiazides (-ide e.g., *hydrochlorothiazide*)

ASCVD | HYPERLIPIDEMIA



ASCVD/Lipids Screening USPSTF 2013

Final Recommendation Statement

Lipid Disorders in Adults: Cholesterol, Dyslipidemia, and Screening

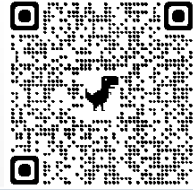
December 30, 2013

Recommendations from the USPSTF are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

[Read the Full Recommendation Statement](#)

Recommendation Summary

Population	Recommendation	Grade
Men 35 and Older	The USPSTF strongly recommends screening men aged 35 and older for lipid disorders.	A
Women 45 and Older at Increased Risk for CHD	The USPSTF strongly recommends screening women aged 45 and older for lipid disorders if they are at increased risk for coronary heart disease.	A
Women 20-44 at Increased Risk for CHD	The USPSTF recommends screening women aged 20-44 for lipid disorders if they are at increased risk for coronary heart disease.	B
Men 20-35 at Increased Risk for CHD	The USPSTF recommends screening men aged 20-35 for lipid disorders if they are at increased risk for coronary heart disease.	B
Men 20-35, Women Not at Increased Risk	The USPSTF makes no recommendation for or against screening for lipid disorders in men and women who are not at increased risk for coronary heart disease.	C

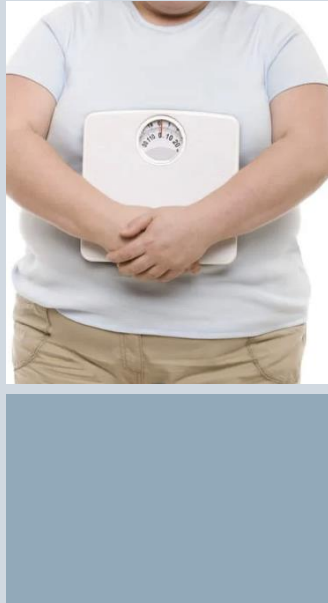


ASCVD/Lipids Screening: USPSTF 2022

Steps for Implementing Screening:

1. Identify **Risk Factors**
2. Estimate **ASCVD Risk** in 40-75 y/o
3. Start *statin* for primary prevention for **>10%**
4. Use shared-decision making to start *statin* in 7.5% - 10%

Population	Recommendation	Grade
Adults aged 40 to 75 years who have 1 or more cardiovascular risk factors and an estimated 10-year cardiovascular disease (CVD) risk of 10% or greater	The USPSTF recommends that clinicians prescribe a statin for the primary prevention of CVD for adults aged 40 to 75 years who have 1 or more CVD risk factors (ie, dyslipidemia, diabetes, hypertension, or smoking) and an estimated 10-year risk of a cardiovascular event of 10% or greater.	B
Adults aged 40 to 75 years who have 1 or more cardiovascular risk factors and an estimated 10-year CVD risk of 7.5% to less than 10%	The USPSTF recommends that clinicians selectively offer a statin for the primary prevention of CVD for adults aged 40 to 75 years who have 1 or more CVD risk factors (ie, dyslipidemia, diabetes, hypertension, or smoking) and an estimated 10-year risk of a cardiovascular event of 7.5% to less than 10%. The likelihood of benefit is smaller in this group than in persons with a 10-year risk of 10% or greater.	C
Adults 76 years or older	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of initiating a statin for the primary prevention of CVD events and mortality in adults 76 years or older.	I



What are **USPSTF ASCVD Risk Factors**?

- ✓ Diabetes
- ✓ Hypertension
- ✓ Dyslipidemia
- ✓ Smoking
- ✓ Obesity/overweight
- ✓ CKD and Albuminuria
- ✓ Family history of premature coronary disease

What are ACC/AHA ASCVD Risk-Enhancing Factors?

- **FHx premature ASCVD**
Males <55 y; Females <65 y
- **Primary hypercholesterolemia**
LDL-C 160-189 mg/dL; non HDL-C 190-219 mg/dL
- **Metabolic syndrome**
Three of any of the following: ↑ waist circumference, ↑ TG, ↑ BP, ↑ glucose, ↓ HDL-C <40mg/dL in males or <50mg/dL in females
- **CKD**
- **High-risk race/ethnicities**
South Asian ancestry
- **Chronic inflammatory conditions**
RA, HIV/AIDS, Psoriasis
- **Hx menopause before 40 yo and hx pregnancy-associated high-risk conditions** (ie. preeclampsia)
- **Lipid/biomarkers**
Persistently elevated TG, ↑ hs-CRP, ↑ Lp(a), ↑ apoB or ABI < 0.9

Comparing **ASCVD Risk Factors**



- Diabetes
- Hypertension
- Dyslipidemia
- Smoking
- Obesity/overweight
- CKD and Albuminuria
- Family history of premature coronary disease




- FHx premature ASCVD
- Primary hypercholesterolemia
- Metabolic syndrome
- CKD
- Chronic inflammatory conditions
- Hx premature menopause and hx pregnancy-associated conditions that increase ASCVD risk
- High-risk race/ethnicities
- Lipid/biomarkers (Lp(a))

ACC ASCVD Risk Estimator



ACC ASCVD Risk Estimator
Calculator for internet browser



AMERICAN
COLLEGE of
CARDIOLOGY

ASCVD Risk Estimator Plus

Estimate Risk | [Therapy Impact](#) | [Advice](#)

Current Age ⁱ *
Age must be between 20-79

Sex * Male Female

Race * White African American Other

Systolic Blood Pressure (mm Hg) *
Value must be between 90-200

Diastolic Blood Pressure (mm Hg) *
Value must be between 60-130

Total Cholesterol (mg/dL) *
Value must be between 130 - 320

HDL Cholesterol (mg/dL) *
Value must be between 20 - 100

LDL Cholesterol (mg/dL) ⁱ
Value must be between 30-300

History of Diabetes? * Yes No

Smoker? ⁱ * Current ⁱ Former ⁱ Never ⁱ

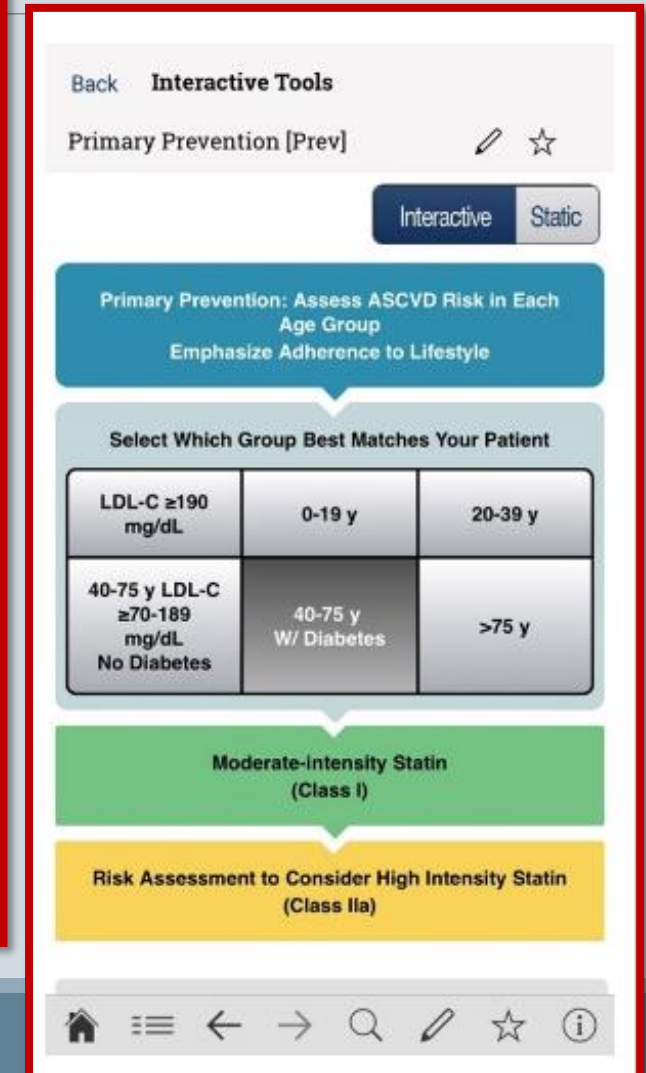
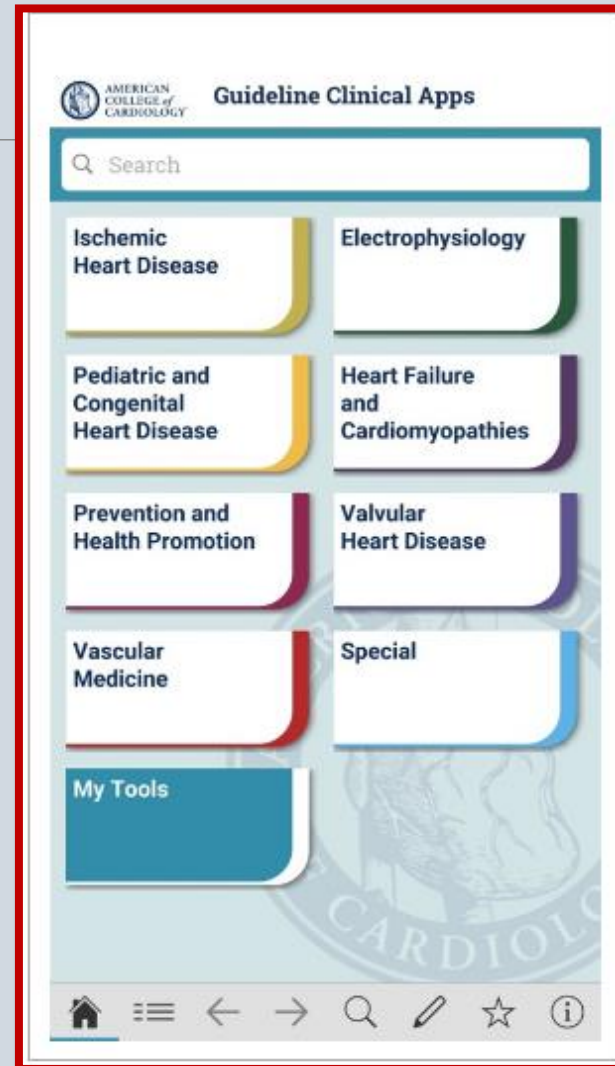
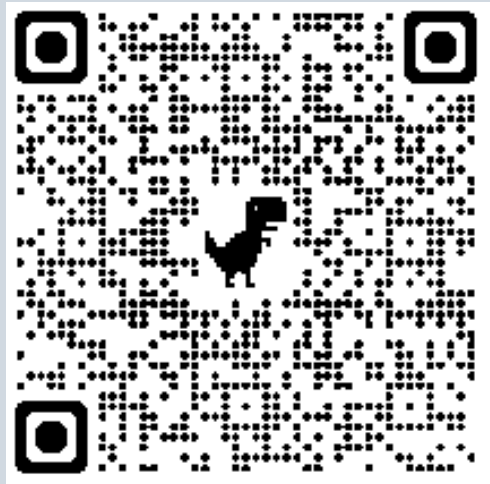
On Hypertension Treatment? * Yes No

On a Statin? ⁱ Yes No

On Aspirin Therapy? ⁱ Yes No

ACC Clinical Guideline Mobile App

COMPREHENSIVE **MOBILE APP** WITH ALL GUIDELINES AND CALCULATORS



ACC/AHA Treatment: Severe Hypercholesterolemia $\text{LDL-C} \geq 190 \text{ mg/dL}$

Start treatment with maximally tolerated **High Intensity STATIN** therapy

Add **Ezetimibe** if:

- Patients achieves $<50\%$ LDL-C reduction
- LDL-C is greater than 100 mg/dL

Add **PCSK9-inhibitor** if:

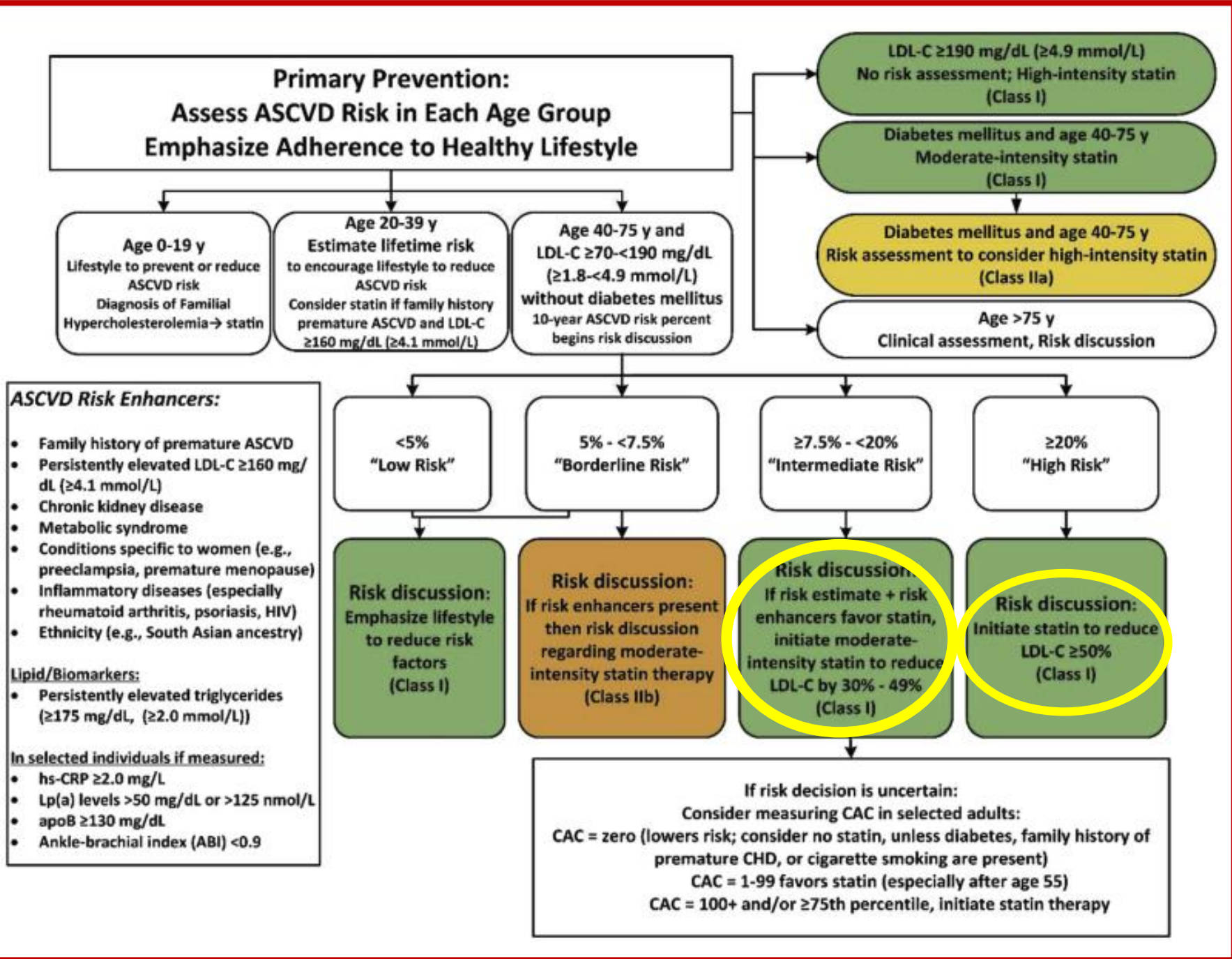
- LDL-C is still greater than 100 mg/dL
- Multiple ASCVD enhancing risk factors



ASCVD Primary Prevention

≥ 20%: Start High Intensity Statin

≥7.5% - <20%: SDM & Moderate Intensity Statin



ASCVD Secondary Prevention

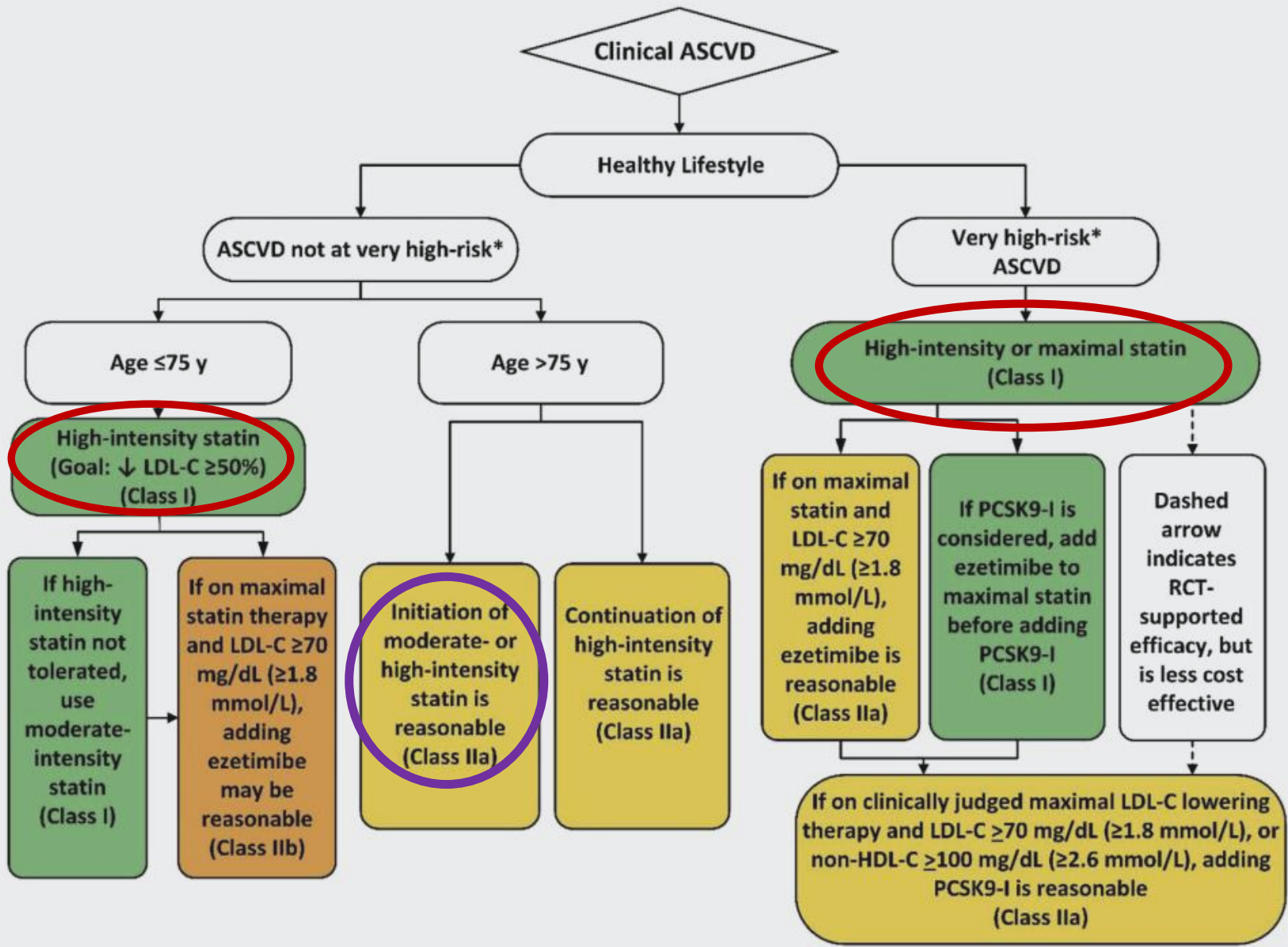
(ie— has had a cardiovascular event)

High Intensity Statin:

*Very HIGH Risk ASCVD

* ≤75 y/o & not very high risk

* >75 y/o may be reasonable



Statin Therapy by Intensity

HIGH ($\geq 50\%$)

Atorvastatin 40mg, 80mg

Rosuvastatin 20mg, 40mg



MODERATE (30%-49%)

Atorvastatin 10mg, 20mg

Rosuvastatin 5mg, 10mg

Simvastatin 20-40mg

Pravastatin 40mg, 80mg

Lovastatin 40mg

LOW ($< 30\%$)

Simvastatin 10mg

Pravastatin 10mg-20mg

Lovastatin 20mg

Treatment Toolbag :

Ezetemibe



When do we use this agent?

- **Severe primary hypercholesteremia** already on statin to get to goal of less than 100 mg/dL
- **Very high risk ASCVD** who have not achieved LDL goal of less than 70 mg/dL while on maximally tolerated statins

How does this work?

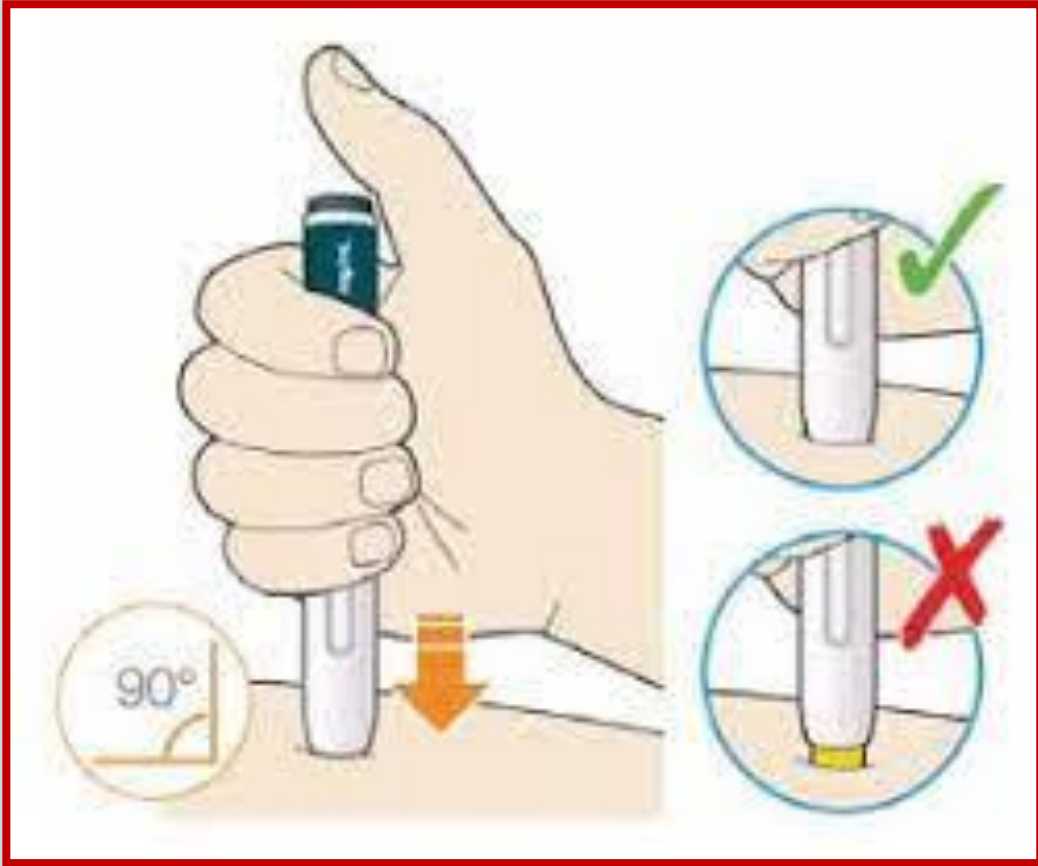
Inhibits cholesterol absorption in the small intestine

Side effects?

Headache, runny nose, sore throat. Less common: diarrhea, body aches, joint aches, fatigues, weakness

Treatment Toolbag :

PCSK9 Inhibitors



When do we use this agent?

- **Very high risk ASCVD** if already on max-tolerated statin and ezetimibe to get to LDL goal of less than 70 mg/dL
- **Primary** hypercholesterolemia or **familial** hypercholesterolemia

How does this work?

- PCSK9 proteins block LDL receptors in the liver that clear LDL

Side effects?

Nasopharyngitis, injection-site reaction

Treatment Toolbag :

Bempedoic Acid

When do we use this agent?

- Statin-intolerant patients who have not achieved LDL reduction
- Can be used in combination with statins and ezetimibe

How does this work?

- **Inhibits ACL enzyme** which decreases cholesterol production in the liver,
- Excreted by the **kidneys**

Side effects?

Uric acid increase (gout?), tendon rupture (<0.5%)



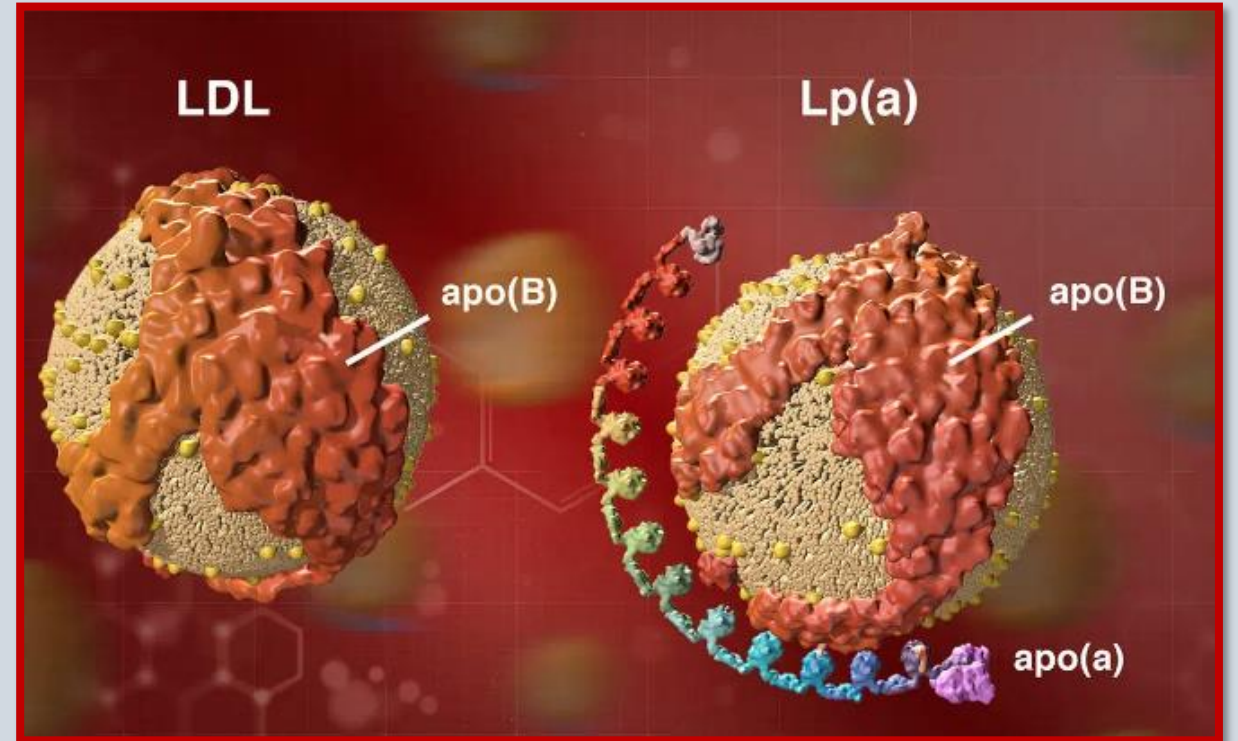
Quick Word about *ApoB* and *Lp(a)*

ApoB

Group of proteins strongly associated with ASCVD and atherosclerosis

Lp(a)

- Inherited trait that affects **20%** of population
- Elevated Lp(a) ≥ 50 mg/dL or ≥ 125 nmol/L is considered **risk enhancing** property
- Risk factor for **early CAD** and **aortic stenosis**



Quick Word about *Triglycerides*

If Hypertriglyceridemia is,	Then,
Moderate (175-499 mg/dL)	Treat lifestyle factors such as obesity, secondary factors (such as diabetes, CKD, liver or thyroid disease) and address meds that increase TG in adults > 20 years old
Moderate to Severe (≥ 500 mg/dL) and ASCVD risk $\geq 7.5\%$	Start statin if TG are persistently elevated after lifestyle and secondary factors are addressed in adults 40-75 y/o
Severe (≥ 500 mg/dL, fasting) and ASCVD risk $\geq 7.5\%$	Start statin and address reversible causes of high TG

- **Notice:** *Fibrates and Niacin are **no** longer recommended*
- **AACE 2022 Update** recommends adding **fibrates** or **icosapent ethyl** if fasting TG are persistently *over >200 mg/dL*
- You could check triglycerides in both fasting and non-fasting states
- If the triglycerides are VERY high, LDL-C will not be calculated by the lab
- Still not at goal, refer your patients to *endocrinologists or cardiologists*

Quick Word about *CAC Score*

CORONARY CALCIUM SCORE CHART



NORMAL ARTERY



BEGINNING OF PLAQUE FORMATION



FATTY DEPOSIT ACCUMULATION



NARROWED ARTERY BLOCKED BY A BLOOD CLOT

The amount of calcium present in the coronary arteries is scored according to the Agatston scale, as follows:

0	No identifiable calcium deposits
1-10	Low Risk. Less than 10% chance of heart disease
11-99	MILD calcium deposits
100-399	MODERATE calcium deposits
400-999	SEVERE calcium deposits
1000+	25% chance of heart attack within a year

Helpful to further risk stratify patients into statin therapy (ie: “tie breaker”)

CAC = 0 Low ASCVD risk

- Consider repeating in 5-10 years if statin therapy has not been started
- “Down Risk “ Caution: Score could be 0 in patients with Risk Enhancing Factors

CAC = 1-99 Intermediate ASCVD risk

CAC ≥ 100 Considered High ASCVD risk

CAC scoring is **NOT useful** in patients taking statins because these will increase CAC score

Quick word about *Aspirin* and ASCVD –

- **Aspirin** (75-162mg/day) can be used as secondary prevention in patients with **DM and ASCVD**
 - Shared decision making should be used to consider aspirin as *primary prevention* in patients at **increased ASCVD risk**
- **DAPT: Dual antiplatelet therapy** (low-dose Aspirin and Clopidogrel)
 - Reasonable for 1 year after acute coronary syndrome (but could be extended)
 - Long term use should be considered in patients with high ischemic risk, prior coronary intervention and low bleeding risk to prevent further cardiovascular events



PREVENT Online Calculator

- **New Calculator: PREVENT** AHA Predicting Risk of CVD Events
- Used in **primary prevention** patients ages 30-79 years and **without** coronary heart disease, stroke, or heart failure
- Incorporates **obesity, diabetes** and **CKD** into the equation for calculating CVD risks in **cardiovascular-kidney-metabolic syndrome**.



PREVENT™ Online Calculator

Sex Male Female

Age years **i**

Total Cholesterol mg/dL **i**

HDL Cholesterol mg/dL **i**

SBP

BMI

eGFR **i**

Diabetes No Yes **i**

Current Smoking No Yes **i**

Anti-hypertensive medication No Yes **i**

Lipid-lowering medication No Yes **i**

The following three predictors are optional for further personalization of risk assessment. When they are clinically indicated or available, please click on yes and enter the value

UACR No Yes **i**

HbA1C No Yes **i**

Zip Code (for estimating social deprivation index [SDI]) No Yes **i**



DIABETES

Diabetes **Screening**: USPSTF

Recommendation (Grade B):

- Screen for prediabetes/diabetes:
 - **Age 35-70**
 - **WITH BMI >25-30** (or >23 in Asian American)
 - **Without** symptoms of diabetes

KEY CHANGE: *Initial screening age 35 (previously age 40)*

Screening tests:

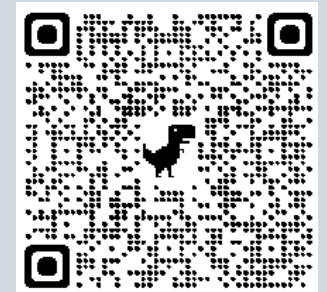
- **Fasting blood glucose** (FBG) *or* **HbA1c** *or* **OGTT**

Frequency:

- Interval is *uncertain*

Preventive **Interventions**:

- Lifestyle modifications *and* metformin have both demonstrated efficacy in slowing progression to diabetes
- Metformin has not *yet* been approved for prediabetes treatment



USPSTF
Prediabetes &
Diabetes
Screening

What does the USPSTF recommend?	<p>Adults aged 35 to 70 years who have overweight or obesity:</p> <ul style="list-style-type: none"> • Screen for prediabetes and type 2 diabetes, and offer or refer patients with prediabetes to effective preventive interventions. Grade: B
To whom does this recommendation apply?	Nonpregnant adults aged 35 to 70 years who have overweight or obesity and no symptoms of diabetes.
What's new?	The USPSTF has lowered the starting age of screening from 40 to 35 years.
How to implement this recommendation?	<p>1. Assess risk:</p> <ul style="list-style-type: none"> • Obtain height and weight measurements to determine whether patient has overweight or obesity. Overweight and obesity are defined as a BMI ≥ 25 and ≥ 30, respectively. <p>2. Screen:</p> <ul style="list-style-type: none"> • If the patient is aged 35 to 70 years and has overweight or obesity. Consider screening at an earlier age if the patient is from a population with a disproportionately high prevalence of diabetes (American Indian/Alaska Native, Black, Hawaiian/Pacific Islander, Hispanic/Latino), and at a lower BMI (≥ 23) if the patient is Asian American. • Screening tests for prediabetes and type 2 diabetes include measurement of fasting plasma glucose or HbA_{1c} level or an oral glucose tolerance test.
How often?	The optimal screening interval for adults with an initial normal glucose test result is uncertain. Screening every 3 years may be a reasonable approach for adults with normal blood glucose levels.
What are other relevant USPSTF recommendations?	The USPSTF has made a recommendation on behavioral weight loss interventions to prevent obesity-related morbidity and mortality in adults with a BMI ≥ 30 . This recommendation is available at https://www.uspreventiveservicestaskforce.org
Where to read the full recommendation statement?	Visit the USPSTF website (https://www.uspreventiveservicestaskforce.org) to read the full recommendation statement. This includes more details on the rationale of the recommendation, including benefits and harms; supporting evidence; and recommendations of others.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision-making to the specific patient or situation.



Figure Legend:

Clinician Summary: Screening for Prediabetes and Type 2 Diabetes BMI indicates body mass index (calculated as weight in kilograms divided by height in meters squared); HbA_{1c}, hemoglobin A_{1c}; USPSTF, US Preventive Services Task Force.

Diabetes **Screening**: ADA Risk-Centered Approach

Overweight/obese with ≥ 1 risk factors:

- **First-degree relative** with diabetes
- High-risk **race/ethnicity**
- **History of CVD, HTN** (treated or untreated)
- **Abnormal Lipids**
 - Low HDL (<35 mg/dL) and/or High TG (>250 mg/dL)
- Conditions associated with **insulin resistance**
 - PCOS
- Physical **inactivity**

Interval of Screening

- **Annually** in patients with **prediabetes**
- Repeat at least every 3 years or more frequently based on results

Special Populations

- History of gestational diabetes (GDM) get lifelong screening in 3-year intervals
- HIV patients

Key Differences Between Authorities

USPSTF

- Screening initiated at **age 35** for **any asymptomatic** individual
- **No optimal screening interval** but 3-year interval may be reasonable

ADA

- For **initial** screening, **prioritizes risk factors** over start age of 35
- **Annual** screening interval advised for people with **prediabetes**
- **Three-year** screening interval for patients who had **GDM**
- **Three-year** screening interval (OR more frequent) depending on **risk factors** or **initial results**
- Patients with **HIV**

DIABETES DIAGNOSTIC CRITERIA:

ADA GUIDELINES

American Diabetes Association criteria for the diagnosis of diabetes

1 A1C $\geq 6.5\%$. The test should be performed in a laboratory using a method that is NGSP certified and standardized to the DCCT assay.*

OR

2 FPG ≥ 126 mg/dL (7 mmol/L). Fasting is defined as no caloric intake for at least 8 hours.*

OR

3 2-hour plasma glucose ≥ 200 mg/dL (11.1 mmol/L) during an OGTT. The test should be performed as described by the World Health Organization, using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water.*

OR

4. In a patient with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose ≥ 200 mg/dL (11.1 mmol/L).

Diagnosis

requires **TWO** results from the same or different/subsequent samples
(except in scenario #4)

Acronyms:

A1C: glycated hemoglobin; NGSP: National Glycohemoglobin Standardization Program; DCCT: Diabetes Control and Complications Trial; FPG: fasting plasma glucose; OGTT: oral glucose tolerance test.

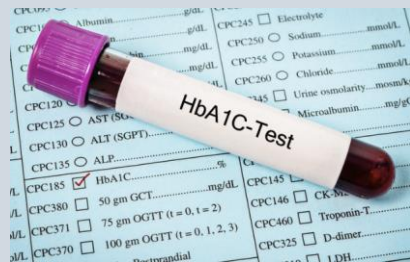
* In the absence of unequivocal hyperglycemia, diagnosis requires two abnormal test results from the same sample or in two separate test samples.

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DIABETES TARGET GOALS: HbA1c

Treatment Goals

- **ADA: < 7%**
- **AACE: < 6.5%**
- **ACP: 7% - 8%**



Keep in mind:

- *A1c could be falsely **elevated** in conditions with decreased RBC turnover -- Anemias (B12 or folate deficiency)*
- *A1c could be falsely **decreased** in conditions with increased RBC turnover -- End-stage renal disease (ESRD)*



DIABETES TREATMENT:

Pharmacologic Options (Think TWO Buckets)

EVERYTHING ELSE: (MOSTLY)

- **Metformin**
- **GIP/GLP-1 receptor agonist**
(eg tirzepatide)
- **GLP-1 receptor agonist**
(eg. semaglutide)
- **SGLT-2 inhibitors**
(eg. dapagliflozin)
- **Thiazolidinediones (TZD)**
(eg. pioglitazone)
- **DPP-4 inhibitors**
(eg. sitagliptan)
- **Sulfonylureas (SU)**
(eg. glipizide)

INSULIN: (OUTSIDE SCOPE OF TODAY'S WORKSHOP)

- **Basal:** Long acting
- **Prandial:** (aka: bolus)
 - Short acting, tons of options
- Start in cases of **severe** hyperglycemia
 - FBG >250 mg/dL
 - Random >300 mg/dL
 - HbA1c at or above 9%

DIABETES TREATMENT: Two Authorities, One Mission

ADA

AMERICAN DIABETES
ASSOCIATION



AACE

AMERICAN ASSOCIATION OF
CLINICAL ENDOCRINOLOGISTS



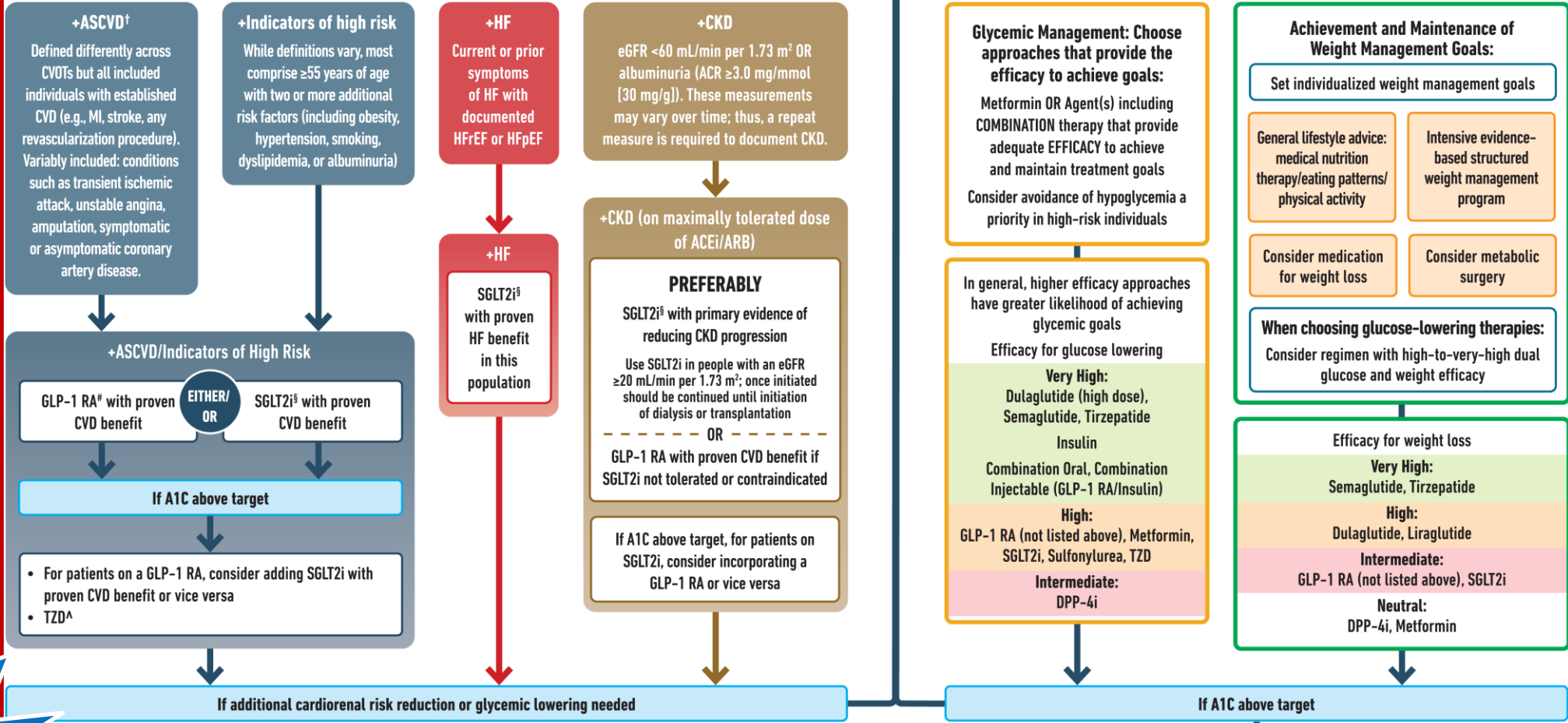
USE OF GLUCOSE-LOWERING MEDICATIONS IN THE MANAGEMENT OF TYPE 2 DIABETES



HEALTHY LIFESTYLE BEHAVIORS; DIABETES SELF-MANAGEMENT EDUCATION AND SUPPORT (DSMES); SOCIAL DETERMINANTS OF HEALTH (SDOH)

Goal: Cardiorenal Risk Reduction in High-Risk Patients with Type 2 Diabetes (in addition to comprehensive CV risk management)*

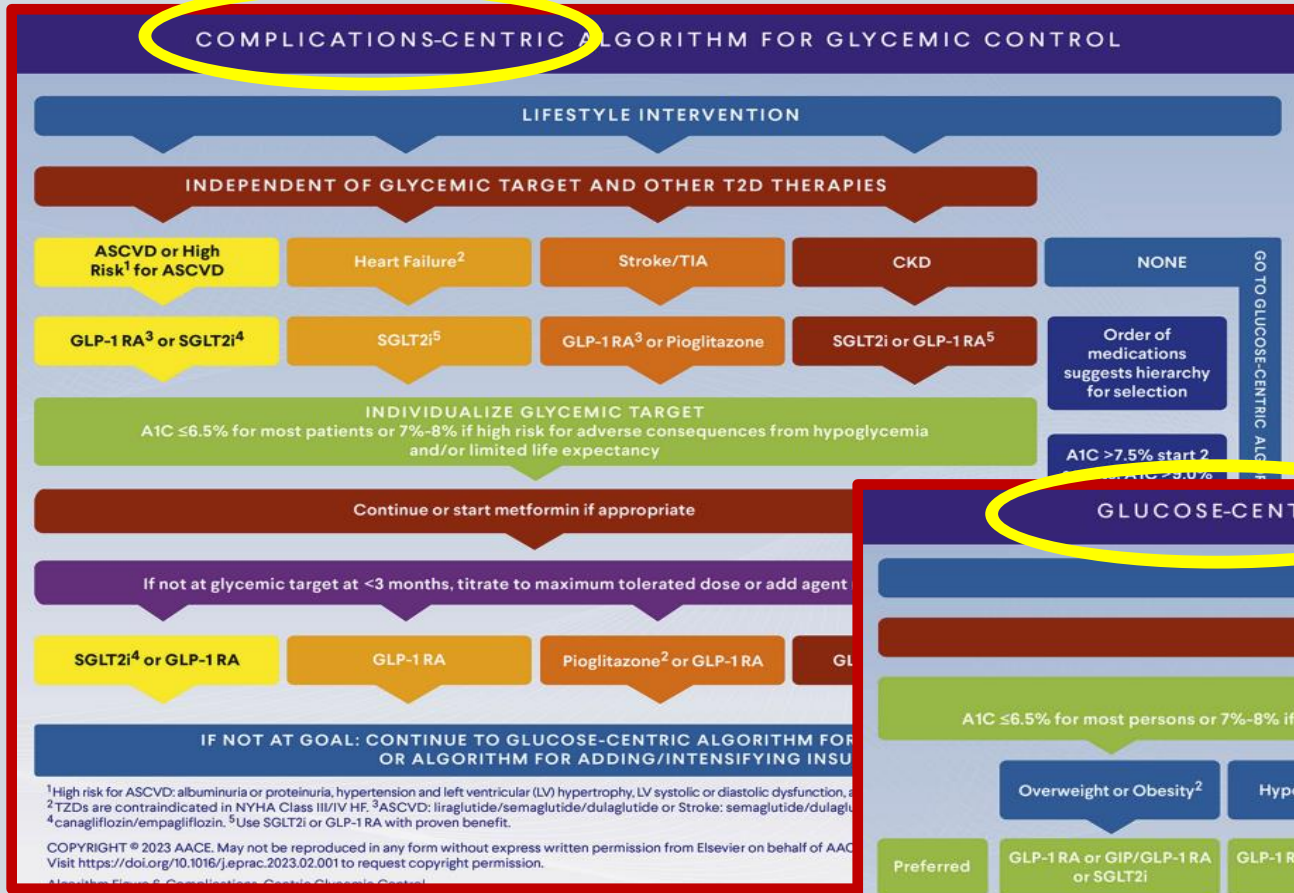
Goal: Achievement and Maintenance of Glycemic and Weight Management Goals



* For people with HF, CKD, established CVD or multiple risk factors for CVD, the decision to use a GLP-1 RA or SGLT2i with proven benefit should be independent of background use of metformin; † A strong recommendation is warranted for people with CVD and a weaker recommendation for those with indicators of high CV risk. Moreover, a higher absolute risk reduction and thus lower numbers needed to treat are seen at higher levels of baseline risk and should be factored into the shared decision-making process. See text for details; ‡ Low-dose TZD may be better tolerated and similarly effective; § For SGLT2i, CV and renal outcomes trials demonstrate their efficacy in reducing the risk of composite MACE, CV death, all-cause mortality, MI, HFrEF, and renal outcomes in individuals with T2D with established/high risk of CVD; # For GLP-1 RA, CVOTs demonstrate their efficacy in reducing composite MACE, CV death, all-cause mortality, MI, stroke, and renal endpoints in individuals with T2D with established/high risk of CVD.

- Identify barriers to goals:**
- Consider DSMES referral to support self-efficacy in achievement of goals
 - Consider technology (e.g., diagnostic CGM) to identify therapeutic gaps and tailor therapy
 - Identify and address SDOH that impact achievement of goals





COMPLICATIONS-CENTRIC ALGORITHM FOR GLYCEMIC CONTROL

LIFESTYLE INTERVENTION

INDEPENDENT OF GLYCEMIC TARGET AND OTHER T2D THERAPIES

ASCVD or High Risk¹ for ASCVD

Heart Failure²

Stroke/TIA

CKD

NONE

GLP-1 RA³ or SGLT2i⁴

SGLT2i⁵

GLP-1 RA³ or Pioglitazone

SGLT2i or GLP-1 RA⁵

Order of medications suggests hierarchy for selection

INDIVIDUALIZE GLYCEMIC TARGET
A1C ≤6.5% for most patients or 7%-8% if high risk for adverse consequences from hypoglycemia and/or limited life expectancy

A1C >7.5% start 2 agents, A1C >9.0% or >1.5% above goal start 2-3 agents

Continue or start metformin if appropriate

If not at glycemic target at <3 months, titrate to maximum tolerated dose or add agent not in use

If A1C >10% and/or glucose >300 mg/dL with symptomatic hyperglycemia, use basal insulin +/- GLP-1 RA

SGLT2i⁴ or GLP-1 RA

GLP-1 RA

Pioglitazone² or GLP-1 RA

GLP-1 RA or SGLT2i⁵

IF NOT AT GOAL: CONTINUE TO GLUCOSE-CENTRIC ALGORITHM FOR GLYCEMIC CONTROL OR ALGORITHM FOR ADDING/INTENSIFYING INSULIN

GO TO GLUCOSE-CENTRIC ALGORITHM FOR GLYCEMIC CONTROL



¹High risk for ASCVD: albuminuria or proteinuria, hypertension and left ventricular (LV) hypertrophy, LV systolic or diastolic dysfunction, ankle-brachial index <0.9.
²TZDs are contraindicated in NYHA Class III/IV HF. ³ASCVD: liraglutide/semaglutide/dulaglutide or Stroke: semaglutide/dulaglutide.
⁴canagliflozin/empagliflozin. ⁵Use SGLT2i or GLP-1 RA with proven benefit.

GLUCOSE-CENTRIC ALGORITHM FOR GLYCEMIC CONTROL

LIFESTYLE INTERVENTION

Start or continue metformin if appropriate¹

INDIVIDUALIZE GLYCEMIC TARGET

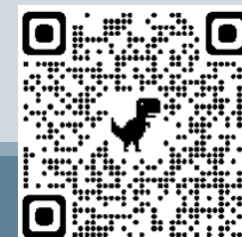
A1C \leq 6.5% for most persons or 7%-8% if high risk for adverse consequences from hypoglycemia and/or limited life expectancy

	Overweight or Obesity ²	Hypoglycemia Risk ³	Access / Cost	Severe Hyperglycemia ⁴	Patients may present with >1 scenario
Preferred	GLP-1 RA or GIP/GLP-1 RA or SGLT2i	GLP-1 RA or GIP/GLP-1 RA or SGLT2i	TZD or SU/GLN	Basal Insulin ⁵ + Prandial Insulin or + GLP-1 RA GIP/GLP-1 RA ⁶	Order of medications suggests hierarchy for selection ⁷
Alternatives	DPP-4i ⁸ or TZD ⁹	DPP-4i ⁸ or TZD	Insulin or DPP-4i ¹⁰	Basal Insulin + other agent(s)	A1C >7.5% start 2 agents. A1C >9.0% or >1.5% above goal start 2-3 agents
Concerns or Not Preferred	Avoid SU/GLN	Avoid SU/GLN	GLP-1 RA GIP/GLP-1 RA SGLT2i COLSVL BRC-QR	Other agents likely ineffective in the setting of glucotoxicity ⁵	

Titrate to maximum tolerated dose. If not at glycemic target at \leq 3 months, add best available agent not in use⁷
 GLP-1 RA | GIP/GLP-1 RA | SGLT2i | TZD | DPP-4i | SU/GLN | COLSVL | BRC-QR | PRAML¹¹

IF NOT AT GOAL: CONTINUE TO ALGORITHM FOR ADDING/INTENSIFYING INSULIN

¹Take with food with dose titration for enhanced tolerance. ²See also COMPLICATIONS-CENTRIC MODEL FOR THE CARE OF PERSONS WITH OVERWEIGHT/OBESITY and PROFILES OF WEIGHT-LOSS MEDICATIONS table. ³Evaluate for issues leading to hypoglycemia or hypoglycemia unawareness and manage with patient-centered strategies. ⁴If A1C >10% and/or BG \geq 300 with symptomatic hyperglycemia, reduce glucose/A1C as promptly and safely as possible. ⁵See also ALGORITHM FOR ADDING/INTENSIFYING INSULIN. ⁶GLP-1 RA requires titration phase which can delay glycemic control. After glucose toxicity is resolved, consider adding other agents. ⁷See also PROFILES OF ANTIHYPERGLYCEMIC MEDICATIONS table. ⁸GLP-1 RA and DPP-4i should not be combined. ⁹TZD can cause fluid retention but have benefit for NAFLD, CVD prevention, dyslipidemia. ¹⁰Access/Cost are dependent on location of the market. Insulin costs vary widely with devices (e.g., pens versus vials) and formulations (e.g., analogues versus combinations such as 70/30). ¹¹PRAML is used as an adjunct with prandial insulin.



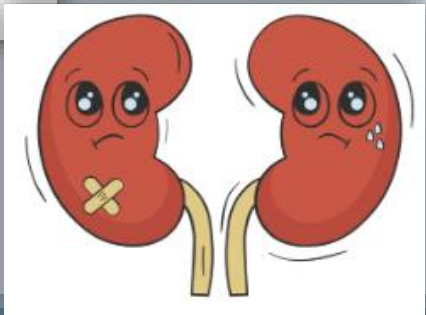
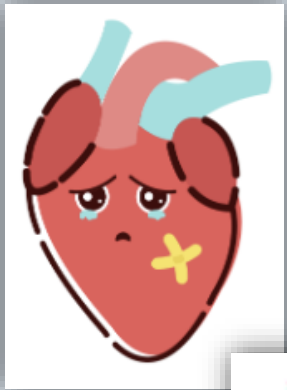
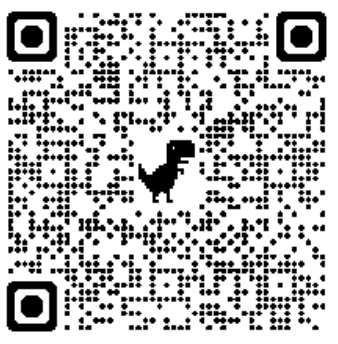
DIABETES **TREATMENT**:

(All Authorities Agree - ADA/AACE)

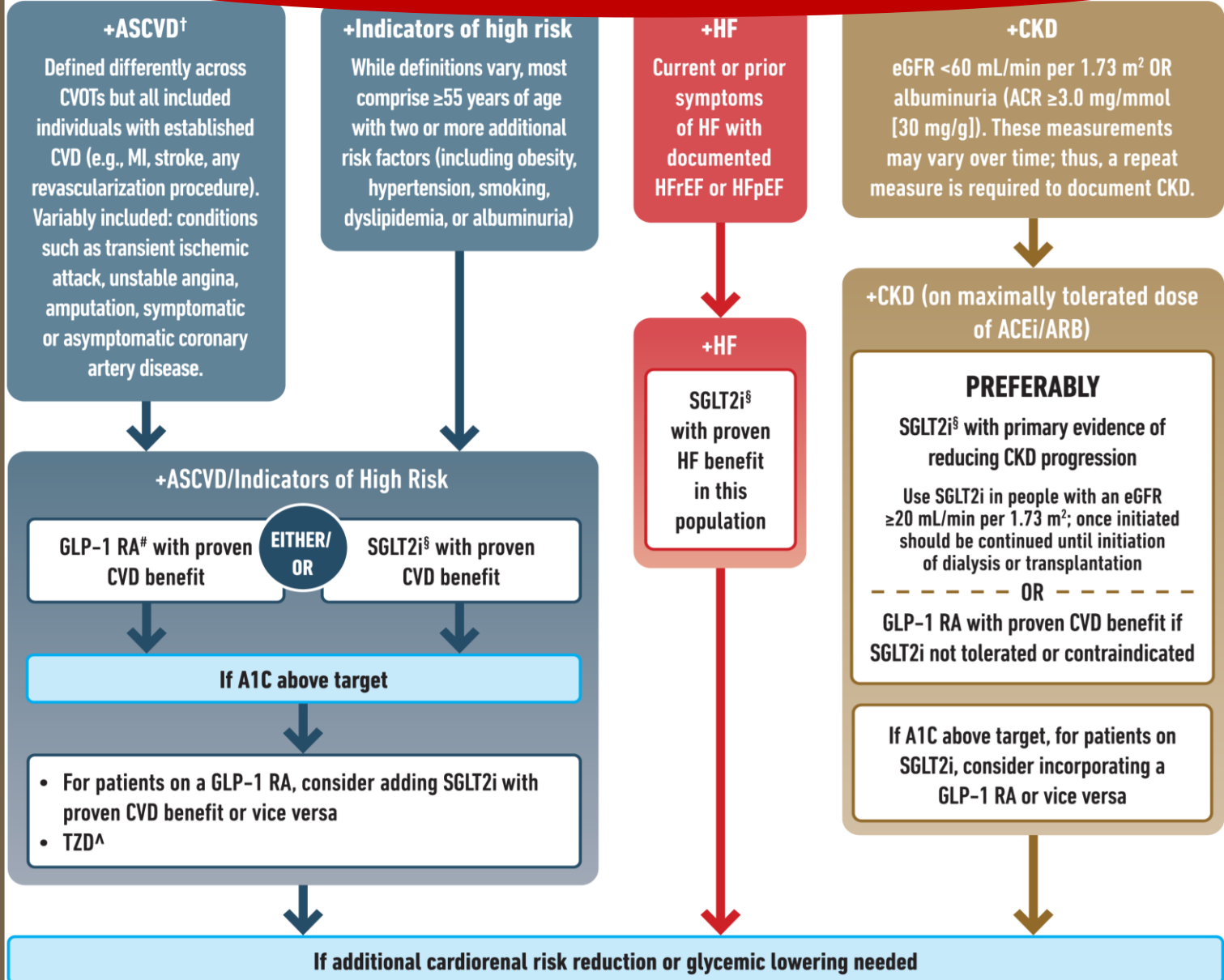
FIRST LINE TREATMENTS (**EVERYONE!**)

- Lifestyle modifications
 - Diet
 - Exercise
 - AHA recommends weekly goals of:
 - 150 mins of moderate intensity exercise
 - OR 75 mins of vigorous intensity exercise





Goal: Cardiorenal Risk Reduction in High-Risk Patients with Type 2 Diabetes (in addition to comprehensive CV risk management)*



FIRST LINE THERAPEUTICS

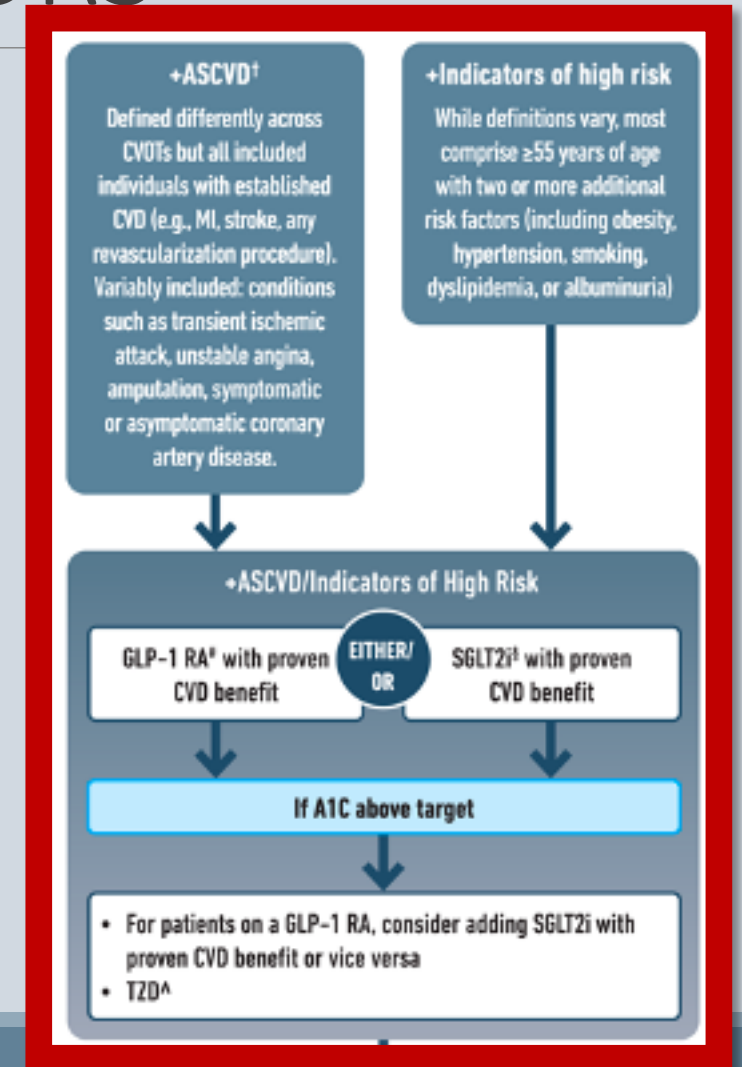
ASCVD or HIGH-RISK INDICATORS

GLP-1 RA

- Do NOT use in thyroid cancer, pancreatic cancer or MEN syndrome
- Side effects: GI issues such as nausea, reflux, diarrhea/constipation

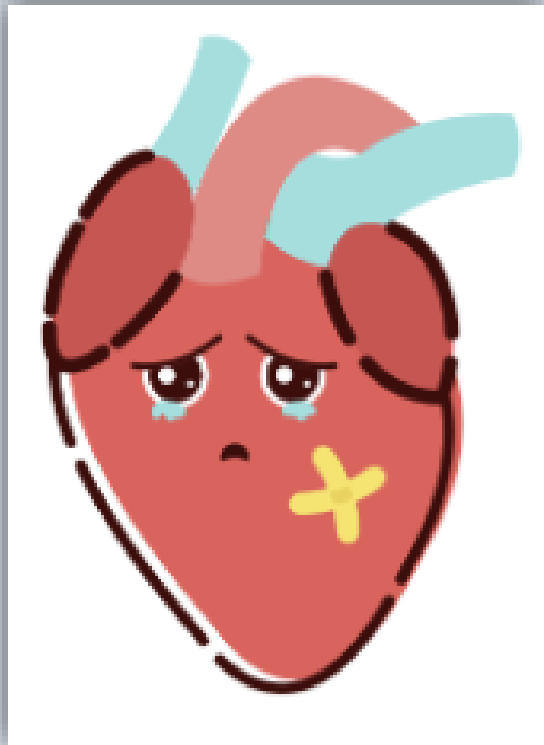
SGLT2i

- Side effects: GU yeast infx
- Pos: slight weight loss, diuresis may lower BP
- Do not use in GFR <30



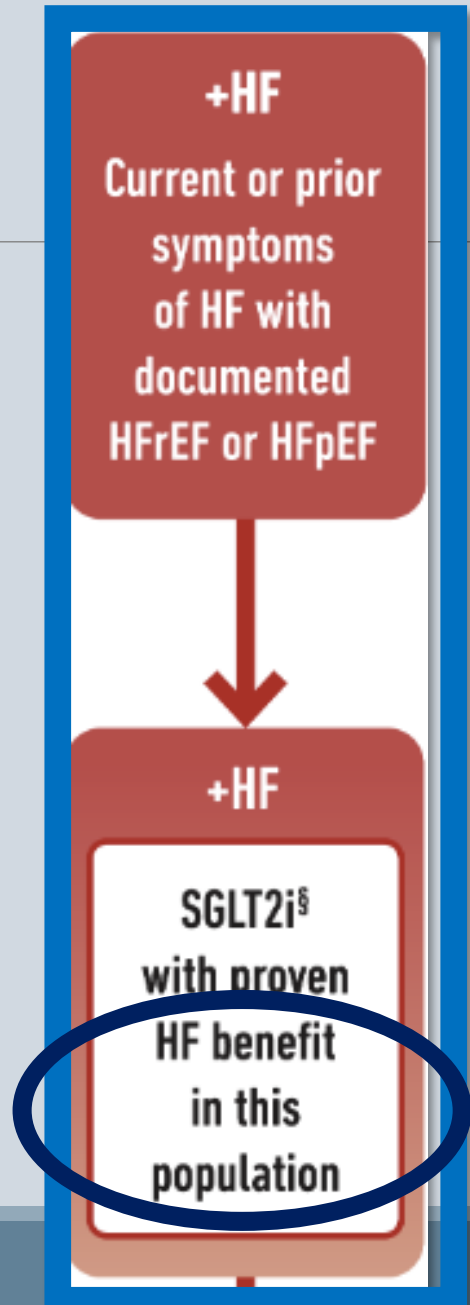
FIRST LINE THERAPEUTICS

Heart Failure



Use SGLT2i

- Neg: GU yeast infx
- Pos: slight weight loss, diuresis may lower BP
- Do not use in GFR <30
- As of 2022, consider medications with **proven HF benefit** such as *canagliflozin*, *dapagliflozin*, *empagliflozin* or *ertugliflozin*

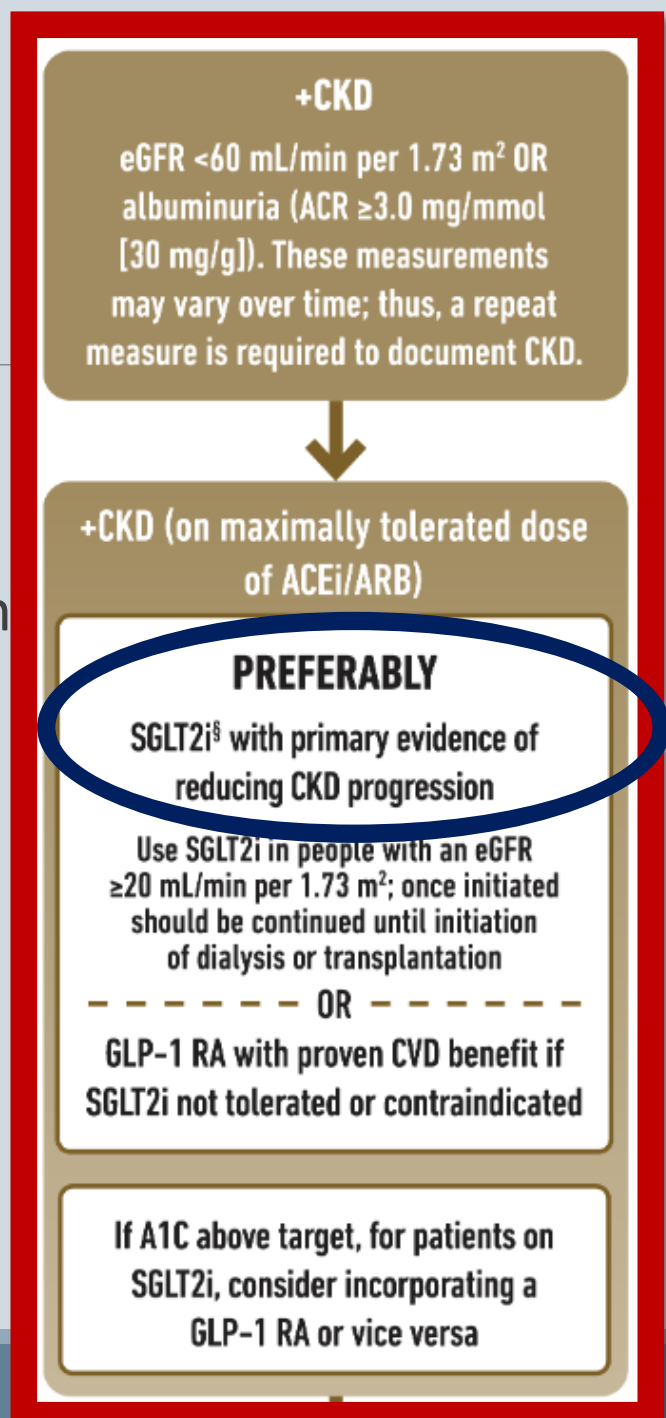


FIRST LINE THERAPEUTICS

Chronic Kidney Disease (CKD)



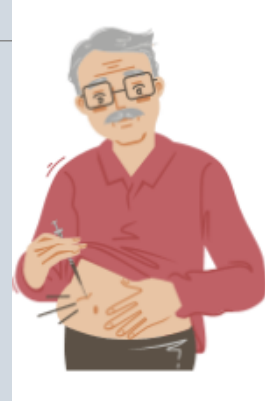
- Use **SGLT2i** with evidence of reducing CKD progression
- As of 2022, consider medications with **CKD reduction benefit** (*canagliflozin, dapagliflozin or empagliflozin*)
- Hold 3-4 days before surgery or during critical illness or prolonged fasting
- *RARE*: Euglycemic DKA or Fournier gangrene
- *Side Effect*: GU mycotic infections and glycosuria



NEXT LINE THERAPEUTICS

Glycemic Management

- **EFFICACY** without/less hypoglycemia
- **Metformin** OR Agent(s) such as *combination* medications that **effectively** achieve and **maintain** glycemic goals



Glycemic Management: Choose approaches that provide the efficacy to achieve goals:

Metformin OR Agent(s) including COMBINATION therapy that provide adequate EFFICACY to achieve and maintain treatment goals
Consider avoidance of hypoglycemia a priority in high-risk individuals

In general, higher efficacy approaches have greater likelihood of achieving glycemic goals

Efficacy for glucose lowering

Very High:

Dulaglutide (high dose),
Semaglutide, Tirzepatide

Insulin

Combination Oral, Combination
Injectable (GLP-1 RA/Insulin)

High:

GLP-1 RA (not listed above), Metformin,
SGLT2i, Sulfonylurea, TZD

Intermediate:

DPP-4i

NEXT LINE THERAPEUTICS

Weight Management

- Select diabetes therapies that will control **BOTH glucose** and **weight**
- General lifestyle modification counseling
- Consider referral to surgery or weight loss medications
- Implement evidence-based weight management

Achievement and Maintenance of Weight Management Goals:

Set individualized weight management goals

General lifestyle advice:
medical nutrition
therapy/eating patterns/
physical activity

Intensive evidence-
based structured
weight management
program

Consider medication
for weight loss

Consider metabolic
surgery

When choosing glucose-lowering therapies:
Consider regimen with high-to-very-high dual
glucose and weight efficacy

Efficacy for weight loss

Very High:
Semaglutide, Tirzepatide

High:
Dulaglutide, Liraglutide

Intermediate:
GLP-1 RA (not listed above), SGLT2i

Neutral:
DPP-4i, Metformin

NEXT LINE THERAPEUTICS

Weight Management

Select therapies based on **WEIGHT LOSS EFFICACY**

Very High

- Semaglutide, Tirzepatide

High

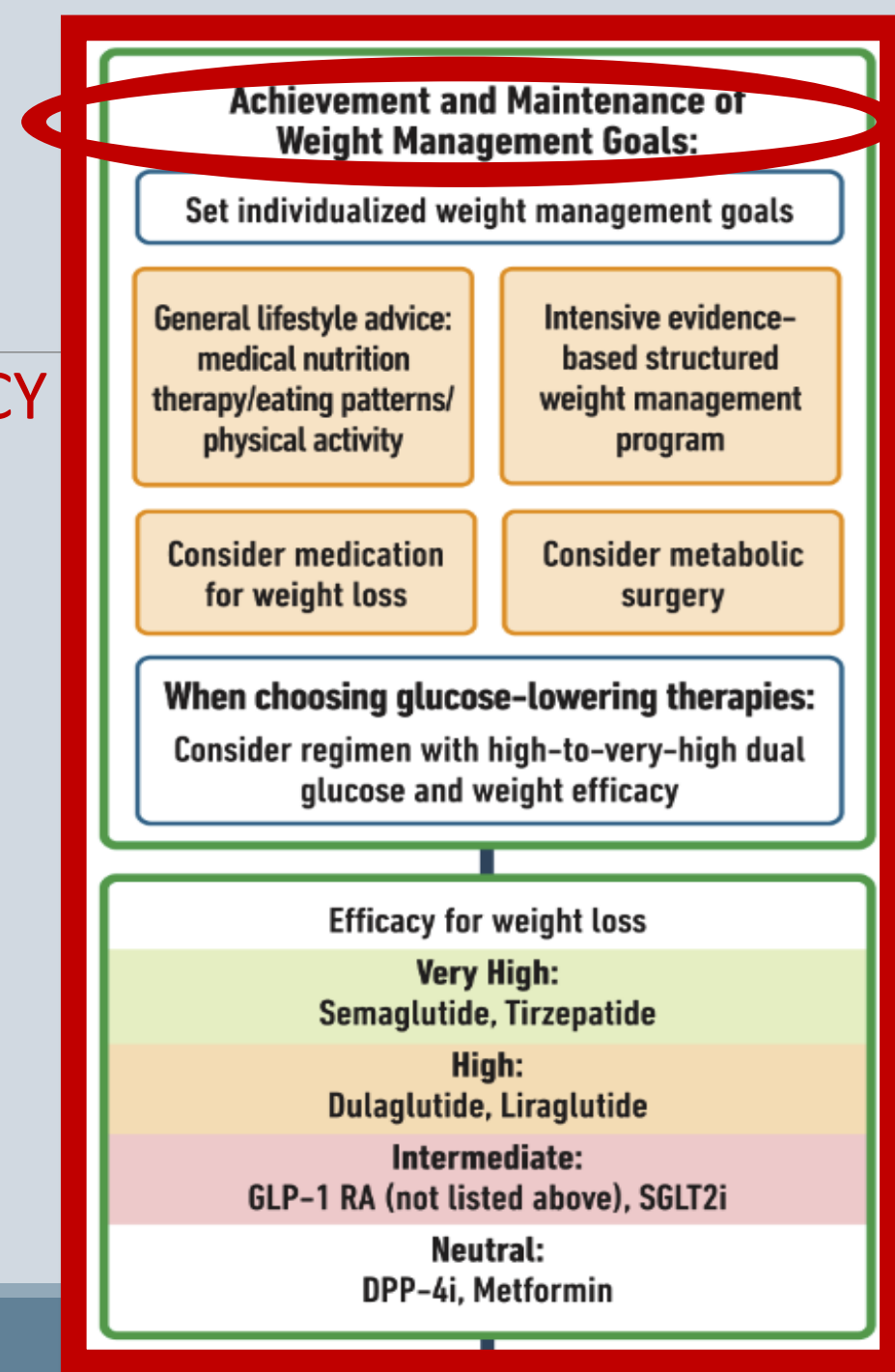
- Dulaglutide, Liraglutide

Intermediate

- GLP-1 not listed above (such as Exentide), SGLT2i

Neutral

- DPP-4i, Metformin



DIABETES TREATMENT:

But what about **Metformin** as first line ?



- Neutral to potential effect on cardiovascular risk
- Low risk of hypoglycemia, low to modest weight loss
- Take with food to lessen GI side effects and monitor for B12 Deficiency
- CKD implications
 - Can be used in eGFR >30
 - Do NOT start if eGFR <45
 - Reduce dose between eGFR 30-45
- Recommended for **prediabetes** by ADA and AACE

DIABETES TREATMENT: What about Tirzepatide?

Classification

- Dual glucagon-like peptide 1/glucose-dependent insulinotropic polypeptide receptor agonist (gip/glp-1)

Very high weight loss potential

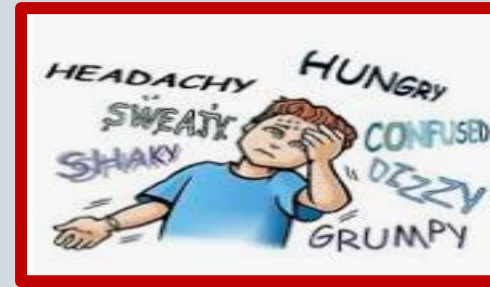
Cost: Very High

Cardiovascular and Renal benefit studies are underway



	Efficacy ¹	Hypoglycemia	Weight change ²	CV effects		Renal effects	
				Effect on MACE	HF	Progression of DKD	Dosing/use considerations*
GIP and GLP-1 RA	Very high	No	Loss (very high)	Under investigation	Under investigation	Under investigation	<ul style="list-style-type: none"> • See label for renal dose considerations • No dose adjustment • Monitor renal function when initiating or escalating doses in patients with renal impairment reporting severe adverse GI reactions

DIABETES TREATMENT: Avoiding Hypoglycemia



Definition

- Decrease in glucose concentration **<70 mg/dL**
- However, this is a moving target based on the individual

Risk Factors

- Medications (Insulin/sulfonylurea)
- Exercise
- Frequency of Meals (food insecurities)

Signs/Symptoms

- Tremor
- Palpitations
- Sweating
- Confusion
- Dizziness
- Anxious/angry/hangry

Treatment **Sugar!**

- Glucose tablets
- Soda/juices
- Raisins
- Sugar/honey

DIABETES TREATMENT: Avoiding Hypoglycemia



Definition

- Decrease in glucose concentration <70 mg/dL
- However, this is a moving target based on the individual

Risk Factors

- Medications (Insulin/sulfonylurea)
- Exercise
- Frequency of Meals (food insecurities)

HYPOGLYCEMIA FANNY PACK ESSENTIALS

Give 15 gm of glucose every 15 minutes until hypoglycemia resolves

GLUCAGON PEN

GLUCOMETER

GLUCOSE TABLETS OR GEL

RULE OF 15

THE CURB SIDERS INTERNAL MEDICINE

The complex block features a light blue background with a red border. It contains several illustrations: a blue Glucagon Pen, a purple Glucometer showing a reading of 9.1, and a red fanny pack with a blue strap. The fanny pack has a white pocket with the text 'RULE OF 15'. The text 'GLUCOSE TABLETS OR GEL' is positioned below the fanny pack. In the bottom right corner, there is a black logo for 'THE CURB SIDERS INTERNAL MEDICINE'. A dark blue speech bubble contains the text 'Give 15 gm of glucose every 15 minutes until hypoglycemia resolves'.

IMPORTANT CONSIDERATIONS



Objective

Counsel and motivate

diverse patient populations on cardiovascular health

with culturally informed lifestyle modifications

while considering social determinants of health

Language, Disease and Inclusivity

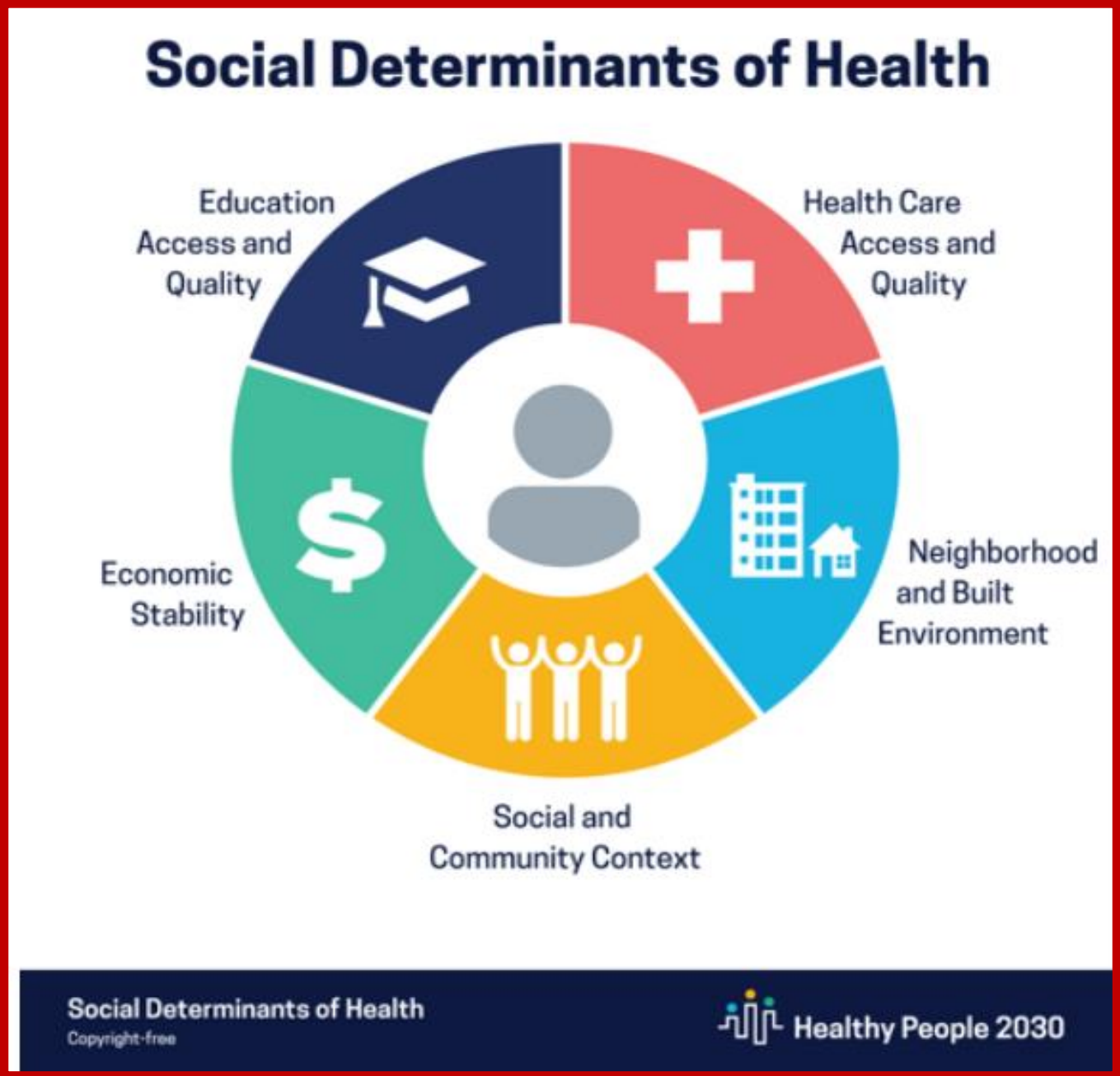
Mindful goal: Avoid labeling our patients

Patients are **NOT** '*diabetics*' - they have a disease called **diabetes**

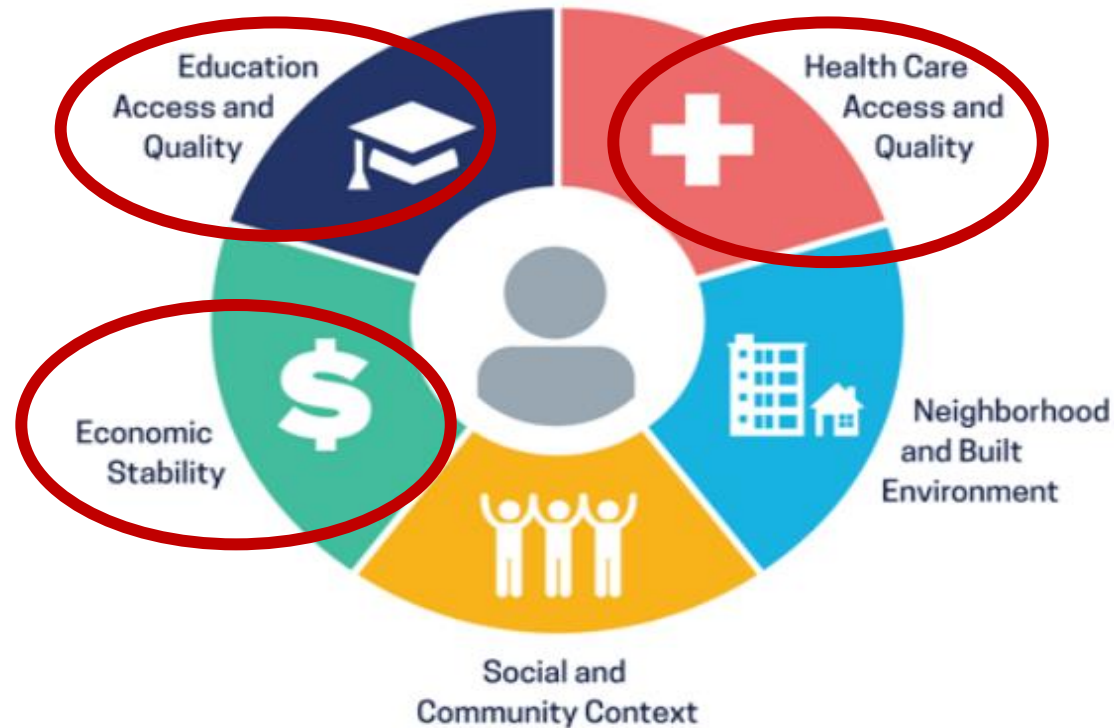
Patients are **NOT** '*obese*' - they have a disease called **obesity**

In summary, use **PEOPLE FIRST** language

*What do we mean by **social determinants of health**?*



Social Determinants of Health



Social Determinants of Health
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 Healthy People 2030

Patient Considerations

Health Care Access and Quality

- Patients who live alone/limited assistance
- Distance to nearest clinics or hospitals
- Cost of medications and testing
 - **Consider telemedicine visit, generic medications**

Education Access and Quality

- Consider health literacy of patient AND caregivers
- Language barriers
 - **Provide materials in native language, consider limited access to internet**

Economic Stability

- Fixed income
- Unemployed
 - **Engage team in identifying patient assistance options (GOODRX or COVERAGE app)**

Social Determinants of Health



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 Healthy People 2030

Patient Considerations

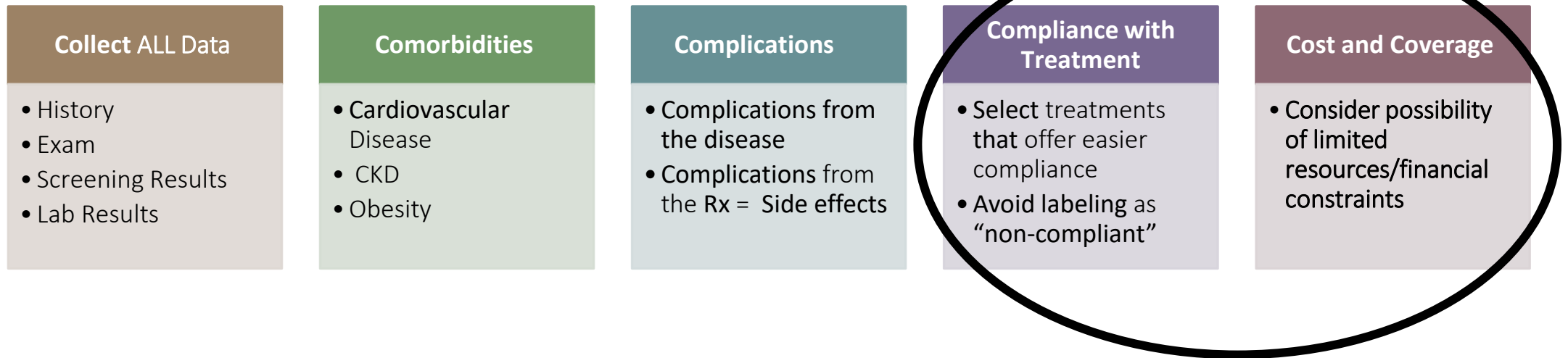
Social and Community Context

- Patients who live alone/limited assistance
- Multi-generation households
- Recent immigrants/Refugees
- Homelessness
- **ASK ASK ASK!**

Neighborhood and Built Environment

- Food deserts and access to healthy foods
- Transportation
- Faith-based community outreach
- Neighborhood safety and its implication on exercise
- Homelessness
- **Reconsider language of 'noncompliance'**
- **Change locus of control – what can we do to help them?**

Isabel's 5Cs of Treatment Considerations



- **Meet each person where they are**
- **GOAL:** Best Outcomes for every patient regardless of situation

References

- American Diabetes Association. (2018). 2. Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes—2018. *Diabetes Care*, 41(Supplement 1), S13–S27.
- Barelski A, Askin C, Lieb D, Williams PN, Watto MF. “#330 & #331 Inpatient Diabetes with Dr. David Lieb”. *The Curbsiders Internal Medicine Podcast*. <http://thecurbsiders.com/episode-list> 25 April, 2022.
- Brian J. Welch, Ivana Zib. *Clinical Diabetes* Oct 2004, 22 (4) 198-200; DOI: 10.2337/diaclin.22.4.198
- Case Study: Diabetic Ketoacidosis in Type 2 Diabetes: “Look Under the Sheets”
- Chandramahanti S, Farzam K. Bempedoic Acid. [Updated 2023 Jul 21]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK594232/>
- Chiu CJ, Antaki J, Michos E, Williams PN, Watto MF. “Advanced Lipidology – Lipids Update 2022: Cardiovascular Risk Reduction and New Medications on the Horizon with Erin Michos, MD”. *The Curbsiders Internal Medicine Podcast*. <http://thecurbsiders.com/episode-list> October 24., 2022.
- Chou R, Cantor A, Dana T, et al. Statin Use for the Primary Prevention of Cardiovascular Disease in Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA*. 2022;328(8):754–771. doi:10.1001/jama.2022.12138
- Cohen JB, Lotito MJ, Trivedi UK, Denker MG, Cohen DL, Townsend RR. Cardiovascular Events and Mortality in White Coat Hypertension: A Systematic Review and Meta-analysis. *Ann Intern Med*. 2019 Jun 18;170(12):853-862. doi: 10.7326/M19-0223. Epub 2019 Jun 11. PMID: 31181575; PMCID: PMC6736754.
- Davidson MH, Dillon MA, Gordon B, Jones P, Samuels J, Weiss S, Isaacsohn J, Toth P, Burke SK. Colesevelam hydrochloride (cholestagel): a new, potent bile acid sequestrant associated with a low incidence of gastrointestinal side effects. *Arch Intern Med*. 1999 Sep 13;159(16):1893-900. doi: 10.1001/archinte.159.16.1893. PMID: 10493319.
- Del Olmo-García MI, Merino-Torres JF. *GLP-1 Receptor Agonists and Cardiovascular Disease in Patients with Type 2 Diabetes*. *Diabetes Res*. 2018 Apr 2;2018:4020492. doi: 10.1155/2018/4020492. PMID: 29805980; PMCID: PMC5902002.
- Feingold KR. Oral and Injectable (Non-Insulin) Pharmacological Agents for the Treatment of Type 2 Diabetes. [Updated 2022 Aug 26]. In: Feingold KR, Anawalt B, Blackman MR, et al., editors. *Endotext* [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK279141/>
- Gandhi MM, Cohen J, Williams PN, Watto MF. “#321 Hypertension FAQ: Common Outpatient Cases.” *The Curbsiders Internal Medicine Podcast*. <http://thecurbsiders.com/episode-list> February 14, 2022.
- Garber AJ, et al. *Endocr Pract*. 2017;23:207-238. ADA. *Diabetes Care*. 2017;40:S64-S74.
- Garber, A. J., Handelsman, Y., Grunberger, G., Einhorn, D., Abrahamson, M. J., Barzilay, J. I., Blonde, L., Bush, M. A., DeFronzo, R. A., Garber, J. R., Garvey, W. T., Hirsch, I. B., Jellinger, P. S., McGill, J. B., Mechanick, J. I., Perreault, L., Rosenblit, P. D., Samson, S., & Umpierrez, G. E. (2020). Consensus statement by the American association of clinical endocrinologists and American college of endocrinology on the comprehensive type 2 diabetes management algorithm - 2020 executive summary. *Endocrine practice : official journal of the American College of Endocrinology and the American Association of Clinical Endocrinologists*, 26(1), 107–139. <https://doi.org/10.4158/CS-2019-0472>
- General principles of insulin therapy in diabetes mellitus. https://www.uptodate.com/contents/general-principles-of-insulin-therapy-in-diabetes-mellitus?search=insulin§ionRank=3&usage_type=default&anchor=H18&source=machineLearning&selectedTitle=2~116&display_rank=1#H7
- General principles of insulin therapy in diabetes mellitus. https://www.uptodate.com/contents/general-principles-of-insulin-therapy-in-diabetes-mellitus?search=insulin§ionRank=3&usage_type=default&anchor=H18&source=machineLearning&selectedTitle=2~116&display_rank=1#H7
- Glycemic Management in Type 2 Diabetes. <https://www.aace.com/disease-state-resources/diabetes/slide-library/glycemic-management-type-2-diabetes>
- Grundys SM, Stone NJ, Bailey AL, Beam C, Birtcher KK, Blumenthal RS, Braun LT, de Ferranti S, Faiella-Tommasino J, Forman DE, Goldberg R, Heidenreich PA, Hlatky MA, Jones DW, Lloyd-Jones D, Lopez-Pajares N, Ndumele CE, Orringer CE, Peralta CA, Saseen JJ, Smith SC Jr, Sperling L, Virani SS, Yeboah J. 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APHA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *J Am Coll Cardiol*. 2019 Jun 25;73(24):3168-3209. doi: 10.1016/j.jacc.2018.11.002. Epub 2018 Nov 10. Erratum in: *J Am Coll Cardiol*. 2019 Jun 25;73(24):3234-3237. PMID: 30423391.
- Heublein M, Valdez I, Brigham SK, Williams P, Watto M. “#243 Diabetes Triple Distilled. The Curbsiders Internal Medicine Podcast. <https://thecurbsiders.com/episode-list> November 23, 2020.
- Hirsch,Timothy M. MS, PA-C Diabetic ketoacidosis, *Journal of the American Academy of Physician Assistants*: November 2017 - Volume 30 - Issue 11 - p 46-47 doi: 10.1097/01.JAA.0000525920.14882.60 <https://thecurbsiders.com/podcast/s2e3-master-hyperglycemia-dka>
- <https://www.asha.org/practice/social-determinants-of-health/>
- Insulin therapy in type 2 diabetes mellitus. https://www.uptodate.com/contents/insulin-therapy-in-type-2-diabetes-mellitus?sectionName=insulin%20initiation&search=insulin&topicRef=1752&anchor=H4142283563&source=see_link#H3624782530
- Khan, S. S., Coresh, J., Pencina, M. J., Ndumele, C. E., Rangaswami, J., Chow, S. L., Palaniappan, L. P., Sperling, L. S., Virani, S. S., Ho, J. E., Neeland, I. J., Tuttle, K. R., Rajgopal Singh, R., Elkind, M. S. V., Lloyd-Jones, D. M., & American Heart Association (2023). Novel Prediction Equations for Absolute Risk Assessment of Total Cardiovascular Disease Incorporating Cardiovascular-Kidney-Metabolic Health: A Scientific Statement From the American Heart Association. *Circulation*, 148(24), 1982–2004. <https://doi.org/10.1161/CIR.0000000000001191>
- Khan, S. S., Matsushita, K., Sang, Y., Ballew, S. H., Grams, M. E., Surapaneni, A., Blaha, M. J., Carson, A. P., Chang, A. R., Ciemins, E., Go, A. S., Gutierrez, O. M., Hwang, S. J., Jassal, S. K., Kovesdy, C. P., Lloyd-Jones, D. M., Shlipak, M. G., Palaniappan, L. P., Sperling, L., Virani, S. S., ... Chronic Kidney Disease Prognosis Consortium and the American Heart Association Cardiovascular-Kidney-Metabolic Science Advisory Group (2023). Development and Validation of the American Heart Association Predicting Risk of Cardiovascular Disease EVENTS (PREVENT) Equations. *Circulation*, 10.1161/CIRCULATIONAHA.123.067626. Advance online publication. <https://doi.org/10.1161/CIRCULATIONAHA.123.067626>
- Nuha A, ElSayed, Grazia Aleppio, Vanita R. Aroda, Raveendhara R. Bannuru, Florence M. Brown, Dennis Bruemmer, Billy S. Collins, Marisa E. Hilliard, Diana Isaacs, Eric L. Johnson, Scott Kahan, Kamlesh Khunti, Jose Leon, Sarah K. Lyons, Mary Lou Perry, Priya Prahalad, Richard E. Pratley, Jane Jeffrie Seley, Robert C. Stanton, Robert A. Gabbay, on behalf of the American Diabetes Association, 9. Pharmacologic Approaches to Glycemic Treatment: Standards of Care in Diabetes—2023. *Diabetes Care* 1 January 2023; 46 (Supplement_1): S140–S157. <https://doi.org/10.2337/dc23-S009>
- Palla M, Saber H, Konda S, Briasoulis A. Masked hypertension and cardiovascular outcomes: an updated systematic review and meta-analysis. *Integr Blood Press Control*. 2018 Jan 5;11:11-24. doi: 10.2147/IBPC.S128947. PMID: 29379316; PMCID: PMC5759852.
- Pokhrel B, Yuet WC, Levine SN. PCSK9 Inhibitors. [Updated 2022 May 13]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK448100/>
- Salam A, Kanukula R, Atkins E, Wang X, Islam S, Kishore SP, Jaffe MG, Patel A, Rodgers A. Efficacy and safety of dual combination therapy of blood pressure-lowering drugs as initial treatment for hypertension: a systematic review and meta-analysis of randomized controlled trials. *J Hypertens*. 2019 Sep;37(9):1768-1774. doi: 10.1097/HJH.0000000000002096. PMID: 30986788. Salam A, Kanukula R, Atkins E, Wang X, Islam S, Kishore SP, Jaffe MG, Patel A, Rodgers A. Efficacy and safety of dual combination therapy of blood pressure-lowering drugs as initial treatment for hypertension: a systematic review and meta-analysis of randomized controlled trials. *J Hypertens*. 2019 Sep;37(9):1768-1774. doi: 10.1097/HJH.0000000000002096. PMID: 30986788.
- Samson SL, Vellanki P, Blonde L, Christofides EA, Galindo RJ, Hirsch IB, Isaacs SD, Izuora KE, Low Wang CC, Twining CL, Umpierrez GE, Valencia WM. American Association of Clinical Endocrinology Consensus Statement: Comprehensive Type 2 Diabetes Management Algorithm - 2023 Update. *Endocr Pract*. 2023 May;29(5):305-340. doi: 10.1016/j.eprac.2023.02.001. PMID: 37150579.
- Schroeder EB. *Management of Type 2 Diabetes: Selecting Amongst Available Pharmacological Agents*. [Updated 2022 Jul 28]. In: Feingold KR, Anawalt B, Boyce A, et al., editors. *Endotext* [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000- <https://www.ncbi.nlm.nih.gov/books/NBK425702/>
- Sizar O, Nassereddin A, Talati R. Ezetimibe. [Updated 2023 Aug 28]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK532879/>
- Standards of Medical Care in Diabetes—2022* Abridged for Primary Care Providers. *ClinDiabetes* 2022;40(1):10–38. <https://doi.org/10.2337/cd22-as01>
- US Preventive Services Task Force, Davidson KW, Barry MJ, Mangione CM, Cabana M, Caughey AB, Davis EM, Donahue KE, Doubeni CA, Krist AH, Kubik M, Li L, Ogedegbe G, Owens DK, Pbert L, Silverstein M, Stevermer J, Tseng CW, Wong JB. Screening for Prediabetes and Type 2 Diabetes: US Preventive Services Task Force Recommendation Statement. *JAMA*. 2021 Aug 24;326(8):736-743. doi: 10.1001/jama.2021.12531. PMID: 34427594.
- US Preventive Services Task Force; Krist AH, Davidson KW, Mangione CM, Cabana M, Caughey AB, Davis EM, Donahue KE, Doubeni CA, Kubik M, Li L, Ogedegbe G, Pbert L, Silverstein M, Stevermer J, Tseng CW, Wong JB. Screening for Hypertension in Adults: US Preventive Services Task Force Reaffirmation Recommendation Statement. *JAMA*. 2021 Apr 27;325(16):1650-1656. doi: 10.1001/jama.2021.4987. PMID: 33904861.
- US Preventive Services Task Force. Statin Use for the Primary Prevention of Cardiovascular Disease in Adults: US Preventive Services Task Force Recommendation Statement. *JAMA*. 2022;328(8):746–753. doi:10.1001/jama.2022.13044
- Valdez I, Colburn J, Williams PN, Watto MF. “#397: Insulin, Type 2 Diabetes, Fanny Packs, and Hypoglycemia with Dr. Jeff Colburn”. *The Curbsiders Internal Medicine Podcast*. thecurbsiders.com/category/curbsiders-podcast May 29, 2023.
- Virani, S. S., Newby, L. K., Arnold, S. V., Bittner, V., Brewer, L. C., Demeter, S. H., Dixon, D. L., Fearon, W. F., Hess, B., Johnson, H. M., Kazi, D. S., Kolte, D., Kumbhani, D. J., LoFaso, J., Mahtta, D., Mark, D. B., Minissian, M., Navar, A. M., Patel, A. R., Piano, M. R., ... Williams, M. S. (2023). 2023 AHA/ACC/ACCP/ASPC/NLA/PCNA Guideline for the Management of Patients With Chronic Coronary Disease: A Report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. *Circulation*, 148(9), e9–e119. <https://doi.org/10.1161/CIR.0000000000001168>
- Whelton, P, Carey, R, Aronow, W, et al. 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: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *J Am Coll Cardiol*. 2018 May, 71 (19) 2199–2269. <https://doi.org/10.1016/j.jacc.2017.11.005>